

POLYPODIUM IN NICARAGUA

Frank C. Seymour¹

The literature treating Polypodium in Nicaragua is very scattered and in the case of many species very scanty. To be sure, large groups of species have been dealt with in excellent manner by different specialists. My indebtedness to them is gladly acknowledged and indicated by the bibliography at the end of this article and by frequent references given from page to page. On the other hand, the literature is sometimes not readily available and, in the case of some species, descriptions are so inadequate that the specimens themselves are almost the only source of information. Nothing can be so good for the purpose except that descriptions are necessary to identify them. There is still need for such a publication as this aims to be. To gather such information and to integrate it is the present purpose.

Polypodium in a broad sense includes all the species on the following pages of this article. However, Copeland in Genera Filicum, while acknowledging that the lines between his genera cannot be sharply drawn, has nevertheless divided Polypodium into several genera. To make of it only two genera, Polypodium and Grammitis, is a middle course, strongly advocated by Morton (Contr. U. S. Nat. Herb. 38:85-123. 1961). While the distinctions between Polypodium and Grammitis as treated by Morton are fairly sharp. Yet the characters by which they are distinguished are minute or difficult. Consequently, for the sake of convenience, it is desirable to treat both of these genera together. The key deals with species of both Polypodium and Grammitis. To do this has made almost unavoidable new combinations of generic and specific names. Such combinations have been made where needed. They consist mostly of transferring to Grammitis species treated by Copeland as Ctenopteris or Xiphopteris.

The following description applies to Polypodium in a broad sense, that is, to Polypodium and Grammitis. Plants mostly epiphytic, mostly tropical. Rootstock usually creeping, either long or short. Paleae, if present, hairy or glabrous, often cil-

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iate, peltate or not. Blades varying from entire to finely dissected. Veins simple or branching, free or anastomosing, with or without included veinlet or veinlets. Indusia none. Sori usually round. Texture of blade thin to coriaceous (leathery).

My indebtedness to herbaria and collectors is gratefully acknowledged. The names of collectors are given wherever specimens are cited. My thanks are expressed to the following directors and their staffs for the privilege of examining specimens and using the facilities of their respective herbaria. Dr. Reed C. Rollins, Director of the Gray Herbarium. Dr. Richard A. Howard, Director of the Arnold Arboretum. Dr. David B. Lellinger, Pteridologist of the United States National Herbarium. Dr. Daniel B. Ward, Director of the Herbarium of the University of Florida. Dr. Humberto Tapia B., Director of the Herbarium of the Escuela Nacional de Agricultura y Ganaderia of Nicaragua. Dr. H. W. Vogelmann, Director of the Pringle Herbarium of the University of Vermont. Dr. Robert W. Long, Director of the Herbarium of the University of South Florida. To Dr. R. M. Tryon of the Gray Herbarium for identifying some of my specimens. To Dr. Ward and Dr. Lellinger, for consultation and identifications and very helpful information.

To Melissa P. Marshall of the University of North Carolina I express my very hearty thanks for the four beautiful india ink drawings published with this article.

The five expeditions to Nicaragua thus far have been accomplished without financial assistance from any university or institution or foundation. Each member of the party has paid his own expense. To some degree, their expenses have been compensated by selling to the writer of this article the specimens which they collected.

Private individuals, however, have helped greatly to make these expeditions financially possible. For such financial assistance, I express my deep gratitude to the following. Edith K. Jones (Mrs. Fred R., Sr.), Mr. & Mrs. Henry F. Lerch, Dr. & Mrs. Chandler S. Robbins, Mary E. Seymour, Irene L. Seymour (Mrs. Frank C.), Rosa M. Robbins (Mrs. Samuel D., Sr.), Dr. & Mrs. Richard B. Seymour, Mina Walter (Mrs. Albert), Mr. & Mrs. George A. Wood.

In identifying specimens collected by my companions and myself, it has been necessary to study all the species known to occur in any country of Central America. Not all of these by any means have been found in Nicaragua, but others undoubt-

edly will be found in this country. They are therefore included in this treatment even if not known at present in Nicaragua.

The next part of this article is an artificial key for the identification of species. To define some terms, by segment is meant a division of a blade without stipulating whether the blade is divided to the axis or only part way. Axis as here used is the median axis of a blade, often called rachis. Pinna is a distinct segment of a blade occurring when the blade is divided to the axis. Lobe is a segment of a blade, joined at least slightly to other segments, occurring when the blade is divided only part way to the axis. After the key is a list of the same species arranged by genera and sections and annotated.

ARTIFICIAL KEY TO SPECIES OF POLYPODIUM
known to occur in Central America.

A. BLADES ENTIRE B. cp. p. 7

B. Sori in 2 or more rows each side of midrib C. cp. p. 5

C. Blades 2-18 mm wide, 3-55 cm long; side-veins often obscure, sometimes evident by transmitted light D.

D. Blades acute to long-acuminate, 2-18 mm wide, 6-55 cm long E.

E. Blades 6-18 mm wide, 6-18 cm long, gradually attenuate 51. P. falcoideum Kuhn

E. Blades 2-18 mm wide, 30-55 cm long, growing on ground 87. P. angustifolium Sw.

D. Blades usually blunt, 8-15 mm wide, 3-9.5 cm long F.

F. Stipes 5-15 mm long; fronds hairy, growing on rocks; veins forming areoles . . . 86. P. anetioides Christ

F. Stipes 2-3.5 cm long, with abundant reddish spreading hairs; hairs 1-1.5 mm long; blades 5-10 mm wide, 3.5-5 cm long; growing on trees; veins pin-nate, not forming areoles 108. G. percrassa (Baker) Seymour

C. Blades 1.8-18 cm wide, 7-95 cm long G.

G. Side-veins obscure, sometimes evident by transmitted light; blades acute to long-acuminate H.

H. Blades gradually narrowed at tip and base; sori several times as long as wide; blade 3-5 cm wide, 8-13 cm long 80. P. Bradeorum Rosenst.

H. Blades abruptly narrowed at tip I.

I. Largest blades 2.5-4 cm wide, 19-28 cm long, tapering very gradually at base; stipes 2 mm wide, 5-18 mm long . . . 91. P. occultum Christ

- I. Largest blades 3-5 cm wide, 9-12(-13) cm long, abruptly narrowed at base; stipes 0.7-0.9 mm wide, 2-9 cm long 97. P. sublucidum Christ
- G. Side-veins prominent, parallel J.
- J. Sori in 1 row between principal side-veins; free veinlets spreading in various directions; areoles fine, many, irregular; blades (3.5-)10-12.5 cm wide, 80-90 cm long 85. P. crassifolium L.
- J. Sori in 2 rows between principal side-veins; free veinlets all directed toward margin; primary veins connected by parallel straight or curved transveinlets K.
- K. Midrib 0.4-0.5 mm wide at base; stipes 0.7-3 mm thick L.
- L. Blades 28-40 cm long, 5-13 times as long as wide 95. P. serpentinum Christ
- L. Blades 12-27 cm long, 1-5 times as long as wide; stipes long, slender M.
- M. Rootstock 8-10 mm thick, densely scaly; fronds clustered; stipes 2-3 mm thick, 18-25 cm long; areoles, except basal ones, divided by veinlet 98. P. tenuipes (Maxon) C. Chr.
- M. Rootstock less than 2 mm thick, essentially naked; fronds distant N.
- N. Blades acute at base; included veinlets 2; areoles not divided by veinlet; rootstock straw-colored 96. P. sphenodes Kunze
- N. Blades obtuse at base; included veinlet 1; blades 2-3(-4) times as long as wide, whitened beneath; largest blades (3-)4-5 cm wide, 7-16 cm long 55. P. glaucophyllum Kunze
- K. Midrib 0.8-2.5 mm wide at base O.
- O. Rootstock short; stipes clustered, 7-15 mm apart P.
- P. Stipes long, 7.5-15 cm long; included veinlets 2 or more except near midrib; midrib 1.2-2 mm wide at base; blade 4-7 cm wide, 30-40 cm long 89. P. costatum Kunze
- P. Stipes short, 12-20 mm long or none Q.
- Q. Midrib 1-1.2 mm wide at base; stipes 12-20 mm long; blades 2.5-3 cm wide, acute to acuminate at tip 90. P. multipunctatum Christ
- Q. Midrib 1.5-2.5 mm wide at base P.
- R. Included veinlet 1; blade 2-5.5 cm wide, 60-70 cm long, abruptly caudate 99. P. Weatherbyanum Seymour
- R. Included veinlets usually 2; blade 4.5-8 cm wide, 30-90 cm long, acute at tip 92. P. Phyllitidis L.

O. Rootstock long, creeping or ascending S.

S. Stipes long, 7.5-15 cm long; included veinlets 2 or more except near midrib; midrib 0.8-1.5 mm wide at base T.

T. Blades 3 cm wide, 55 cm long, about 17 times as long as wide, long-acuminate at tip; rootstock ascending 93. P. Pittieri Christ

T. Blades 5-7.5 cm wide, 30 cm long, 4-6 times as long as wide, long-acuminate or cuspidate at tip; rootstock creeping on trunks of trees; areoles in rows of 12-15 between midrib and margin with 2 sori in each 88. P. coarctatum Kunze

S. Stipes short (2-5 cm long) or none; scales of rootstock falling; midrib 1-1.2 mm wide at base U.

U. Rootstock 3-8 mm thick, its scales filiform; blades long-attenuate at base but finally abruptly narrowed, not decurrent; blade (1.5-)2.5-6 cm wide, 30-46 cm long 100. P. xalapense (Fee) Christ

U. Rootstock 2-2.2 mm thick; stipes about 2-5-12.5 (-13) cm long straw-colored, 3 cm or more apart, with few, linear scales near base; blade 5-5.5 cm wide, 40 cm long 94. P. repens Aublet

B. Sori in 1 row each side of midrib; side-veins obscure V. cp. p. 3

V. Blades neither scaly nor hairy beneath except sometimes on midvein, or with very few scales W. cp. p. 6

W. Sterile blades much wider or shorter than fertile blades X.

X. Sterile blades ovate, 5-7 (-13) mm wide, 7-12 mm long; fertile blades, 2.5-3 mm wide, 15-25 mm long 46. P. tectum Kaulfuss

X. Sterile blades 8-25 mm wide, 2.5-10 cm long; fertile blades 7 mm wide; scales of rootstock 6-10 mm long, long-attenuate, appressed Y.

Y. Rootstock 3-5 mm thick; sterile blades 2-4 cm wide, 5-20 cm long; fertile blades 8-25 mm wide, 8-18 cm long; scales of rootstock with whitish tips 43. P. Palmeri Maxon

Y. Rootstock 1.3-3 (-4) mm thick; sterile blades 12-25 mm wide, 5-10 cm long; fertile blades 5-10 (-15) mm wide, 2-9 cm long; scales of rootstock with thread-like tip, rust-colored or darker 42. P. lycopodiodes L.

W. Fertile and sterile blades about the same size and shape Z.

Z. Sterile and usually fertile blades acute to acuminate or attenuate at tip, not dark-margined a.

- a. Blades 2-18 mm wide, 30-55 cm long, growing on ground 87. P. angustifolium Sw.
- a. Blades 10-30 mm wide, 2-18 cm long b.
- b. Sori about 1/2 as wide as blade; blades 10 mm wide, 2 cm long; cp. p. 7. 81. P. Brunei Christ
- b. Sori less than 1/4 as wide as blade; blades 18-30 mm wide, 12-18 cm long; veins copiously anastomosing . . . 44. P. persicariaefolium Schrader
- Z. Sterile and usually fertile blades rounded at tip d.
- c. Blades densely or sparsely hairy, not dark-margined; veins once forked d.
- d. Rootstock with scales; blades abundantly hairy; hairs about 1 mm long
- . . . 110. G. yarumalensis (Hieron.) Proctor
- d. Rootstock without scales; very short, obscured by fronds; blades sparsely hairy with long reddish hairs, 4-5 mm wide; frond 5-8 cm long 105. G. jungermannioides (Klotzsch) Ching
- c. Blades glabrous except sometimes on margin e.
- e. Veins, both fertile and sterile, mostly once forked; stipe and margin slightly hairy; sori elliptic when young; blade up to 9 mm wide, 12 cm long 101. G. marginella (Sw.) Sw.
- e. Veins once forked or not forked, obscure except by transmitted light; veins of sterile blades not forked f.
- f. Longest blades 8-9 mm wide, 14 cm long; border narrower than in the next species; fronds pendent; sori oval
- 103. G. bryophila (Maxon) Seymour
- f. Longest blades narrower, 5 mm wide, more than 10 cm long; border wider; veins of fertile blades nearly unforked; blades whitened beneath 107. G. nigro-limbatum Spruce
- V. Blades scaly beneath, not only on midrib, acute to attenuate; g. cp. p. 5
- g. Blades long-hairy on margin; fertile blades 2-9 mm wide, 2.6 cm long; sterile blades ovate, 7-21 mm wide, 1.7-5.5 cm long h.
- h. Sori projecting beyond margin of blade; fertile blades 2-4 mm wide, 2-4 cm long . . 41. P. ciliatum Willd.
- h. Sori not reaching margin of blade; fertile blades 3-9 mm wide, 2.5-6 cm long . . 45. P. piloselloides L.
- g. Blades not hairy on margin i.
- i. Blades with long slender tip extending 2-4 cm beyond sori; fertile blades 12-22 mm wide, 18-35 cm long; sterile blades 30-35 mm wide; rootstock 1.5-3 mm

thick, its scales blackish; surface of blade usually concealed by scales 83. P. percussum Cav.

i. Blades acute to slightly acuminate at tip j. This part of key is largely from Weatherby, Contr. Gray Herb. 65: 5-13. 1922, slightly modified, abbreviated and some species added j.

j. Scales of rootstock grayish or reddish-brown k.

k. Rootstock 0.75-1 mm thick, its scales 0.8-1 mm long, grayish; fertile slightly narrower than sterile blades; cp. below 77. P. panamense Weath.

k. Rootstock 2-3 mm thick, its scales 1.2-2 mm long, reddish-brown l.

l. Fertile much narrower than sterile blades, 5-9 mm wide; sori half or a little more than half as wide as blade; fertile blades 5-6 mm wide, 8.5-11 cm long; sterile blades 1.5-2 cm wide, 9-10.5 cm long 75. P. fructuosum Maxon & Weath.

l. Fertile blades 11-12 mm wide; sori not half as wide as blade; cp. p. 6 81. P. Brunei Christ

j. Scales of rootstock usually blackish or dark in color, often with pale margins, rarely pale and of one color m.

m. Cell walls laterally excurrent, evenly and conspicuously latticed (clathrate) under hand lens; rootstock 1 mm thick; cp. above 77. P. panamense Weath.

m. Cell walls never laterally excurrent or latticed n.

n. Scales of rootstock nearly uniform, appressed, sub-orbicular, peltate, 1 mm or less in diameter, blackish; trichomes abundant making appearance tomentose; stipe flattened, 5-18 mm long, often obsolete; sori usually oblong; blades with thin, not cartilaginous margin 74. P. astrolepis Liebm.

n. Scales of rootstock of 2 kinds, one larger 1.5-4 mm long, conspicuous, the other smaller, concealed by larger scales; trichomes present; margin of blades cartilaginous, thickened; sori round to widely oval o.

o. Scales of rootstock arose or pectinate-serrulate; trichomes dense, conspicuous; scales of blade usually sparse; stipe flattened or terete 76. P. lanceolatum L.

o. Scales of rootstock entire or with a merely irregular or at most minutely denticulate margin; trichomes not conspicuous; blade (except in var. interjectum) densely scaly beneath; stipe 1-4.5 cm long. 78. P. peltatum Cav.

- A. BLADES NOT ENTIRE, variously lobed or divided p. cp. p. 3
- p. Sorus 1 on a segment q. cp. p. 9
- q. Lower segments divided into linear lobes; blades bipinnatifid 25. P. fallax C. & S.
- q. Lower (and other) segments not divided; blades 2-9 mm wide, toothed or simply pinnate r. cp. p. 8
- r. Upper fertile part of blade not lobed, differentiated from the lower sterile part; blades 2 mm wide s.
- s. Fertile tip as long as sterile base 120. G. Skutchii (Maxon) Seymour
- s. Fertile tip shorter than sterile base t.
- t. Rootstock lengthened; sterile lobes tooth-like 118. G. serrulata (Sw.) Sw.
- t. Rootstock short; sterile lobes oblong 116. G. myosuroides (Sw.) Sw.
- r. Upper fertile part of blade not differentiated from lower sterile part; blade lobed up to tip, 3-9 mm wide u.
- u. Segments triangular, widened at base usually acute; blades lobed more than half way to axis, 3-6 mm wide v.
- v. Blades 5-6 mm wide, 10-14 cm long; hairs long, reddish, at least on margins 112. G. caucana (Hieron.) Morton
- v. Blades scarcely 4 mm wide, about 6 cm long, rounded at tip. 123. G. zurquina (Maxon) Seymour
- u. Segments, at least lower ones, oblong, blunt; blades 3-9 mm wide w.
- w. Segments joined at base by a narrow wing; blades 6-9 mm wide. 122. G. truncicola (Klotzsch) Morton
- w. Segments almost or quite distinct, oblong, with margins nearly parallel x.
- x. Segments glabrous; blades 3-5 mm wide y.
- y. Fertile veins forked; sporangia long-setulose; stipe none 116. G. Mitchellae (Baker) Seymour
- y. Fertile and sterile veins simple; sporangia not setulose 114. G. delitescens (Maxon) Proctor
- x. Segments hairy; hairs reddish; blades 3-9 mm wide; stipe about 1 cm long z.
- z. Segments at least slightly gibbous, that is, distinctly widened on upper side near base; veins forked; blades 4-8 mm wide A.
- A. Segments slightly gibbous; blades 5-7 mm wide 111. G. blepharodes (Maxon) Seymour

- A. Segments conspicuously gibbous; fertile veins prolonged beyond sori; blades (3-)4-8 mm wide 121. G. trichomanoides (Sw.) Ching
- z. Segments not at all gibbous; paleae often setulose; sori contiguous to midvein; blades 3-9 mm wide B.
- B. Veins not forked; margins of segments parallel; blades setose; segments oblong; paleae not setulose; fronds 3-6.5 cm long . . . 113. G. Cookii (Underw. & Maxon) Seymour
- B. Veins of fertile blades, at least, forked; paleae setulose C.
- C. Hairs of paleae weak, setulose, hyaline; blades 7-9 mm wide; segments oblong 115. G. hyalina (Maxon) Seymour
- C. Hairs of paleae firm, dark-brown; blades (3-)4-6 mm wide; veins of sterile blades sometimes forked; fronds usually 5 cm long 119. G. setulosa (Rosenst.) Seymour
- p. Sori 2 or more on a segment D. cp. p. 8
- D. Blades lobed less than 1/2 way to axis, hairy, spongy, thick; lobes about 1 per cm E.
- E. Veins almost regularly anastomosing, forming a row of areoles along midrib; entire basal part of blade elongate; blades ciliate; sori sunken 104. G. crispata (J. Smith) Morton
- E. Veins mostly free; sori not sunken F.
- F. Blades 2-3.5 (-4) cm wide; lobes angular; sori long; marginal area without veins or sori; stipes 5-10 cm long 109. G. trifurcata (L.) Copel.
- F. Blades 5-12 mm wide, 3.5-5 cm long; lobes very rounded; sori often oval, longer than wide 108. G. percrassa (Baker) Seymour
- D. Blades lobed more than 1/2 way or divided to axis, 15-45 cm long or longer; longest segments are meant on the following pages unless otherwise indicated G.
- G. Segments lobed or divided H. cp. p. 10
- H. Lower segments lobed near tip; longest segments 2-6 mm wide below forks, 2-10 cm long or longer; margins at base parallel; fronds hanging downward I.
- I. Sori borne on projecting rounded teeth of segments; segments 8-20 cm long; axis with wing 5 mm wide 154. G. podocarpa (Maxon) Seymour
- I. Sori borne on segments near midrib; cp. p. 12 131. G. capillaris (Desv.) Seymour
- H. Lower segments lobed or divided near base; blades divided to axis J.
- J. Lower pinnae 5-10 mm long; fronds erect 25. P. fallax C. & S.

- J. Lower pinnae (1.8-)2-6 cm long K.
- K. Longest lobes of pinnae 2-4 mm wide, not again lobed or only slightly lobed L.
- L. Pinnae lobes on both upper and lower margins 31. P. murorum Hk.
- L. Pinnae lobes on lower margin only; longest pinnae (12-)13-25 mm wide, (5-)8.5-14 cm long; upper pinnae attached by wider tissue than the lower pinnae; cp. p. 19, 22 21. P. dissimile L.
- K. Longest lobes of pinnae 0.2-1 mm wide, sometimes again lobed M.
- M. Lobes of lowest pinnae slightly or not at all lobed; ultimate segments 0.7-1 mm wide, only lowest (largest) pinnules lobed; scales with many lobes 29. P. Lindenianum Kunze
- M. Lobes of lowest pinnae distinctly lobed; ultimate segments 0.3-0.7 mm wide; pinnules many; scales, many of them, short-lobed, with few long lobes 26. P. Friedrichsthalianum Kunze
- G. Segments entire or toothed, not lobed N. cp. p. 9
- N. Lowest pinnae attached to axis by midrib or petiole only, rounded or narrowed or heart-shaped or truncate at base, not narrowed just above base; segments more than twice as long as wide O. cp. p. 12
- O. Axis and midrib of segments hairy or scaly P. cp. p. 11
- P. Hairs of axis and of midrib of segments long, abundant Q.
- Q. Longest segments 3-5 mm wide, 16-30 mm long, with lime-dots on upper surface 167. G. turrialbae (Christ) Seymour
- Q. Longest segments 2 mm wide, 3-8 mm long; growing on rocks or trees 140. G. heteromorpha (Hk. & Grev.) Morton
- P. Hairs or scales of axis and midrib of pinnae short, fine, occurring at least on upper part of frond; veinlets forked 1-3 times R.
- R. Veins forking and rejoining (anastomosing), forming regular ample areoles; lowest pinnae often longest; areoles and sori in 1 series each side of midrib S.
- S. Pinnae gradually narrowed to base, longest ones 3-6 cm long . . . 68. P. rhachypterygium Liebm.
- S. Pinnae abruptly narrowed to base, toothed, longest (5-)10-26 mm long; stipe straw-colored 65. P. plectolepis (Fée) Hk.

- R. Veins free, if branching not rejoining T.
- T. Pinnae uniformly crenate; longest pinnae 15 mm wide, 12-15 cm long, on very short stalks 13. P. adelphum Maxon
- T. Pinnae irregularly toothed, teeth low, sometimes obscure; pinnae rounded or truncate at base; stipe straw-colored; lowest pinnae on extremely short stalks U.
- U. Longest pinnae (6-)8-11 cm long 18. P. subpetiolatum Hk.
- U. Longest pinnae 3-5 cm long 23. P. ursipes Moritz
- O. Axis and midrib of pinnae glabrous or nearly so; free veinlets all pointing toward margin V. cp. p. 10
- V. Sori in 1 row each side of midrib of pinnae W.
- W. Pinnae regularly clearly toothed (serrate), not decurrent on axis 17. P. macrodon Hk.
- W. Pinnae entire or irregularly undulate; axis sometimes narrowly winged X.
- X. Lowest pinnae heart-shaped at base, sessile, 1.5 cm wide, 5.5 cm long; upper pinnae adnate to axis; veins mostly free 14. P. aequale Maxon
- X. Lowest pinnae narrowed at base, often on stalks, longest ones (6-)12-23 cm long; veins somewhat anastomosing Y.
- Y. Longest pinnae (1.2-)2-3(-4) cm wide, 15-22(-32) cm long Z.
- Z. Growing on trees, epiphyte 61. P. Lowei C. Chr.
- Z. Growing on ground . . 71 . P. triseriale Sw.
- Y. Longest pinnae (5-)8-13 mm wide, margins almost undulate, almost entire aa.
- aa. Pinnae gradually narrowed at base, the longest 6-13 mm wide, 13.5-25 cm long 16. P. fraternum C. & S.
- aa. Pinnae abruptly narrowed at base, margins serrate or entire; longest pinnae 20 mm wide, 27 cm long . . . 70. P. sessilifolium Liebm.
- V. Sori in 2-6 or more rows on each side of midrib of pinnae bb.
- bb. Veins raised beneath; scales of rootstock very wide at base, attenuate at tip; veins anastomosing; pinnae 9-18 mm wide, 10-15 cm long 47. P. attenuatum H. & B.
- bb. Veins not raised beneath; rootstock stout, its scales spreading cc.
- cc. Veins none of them rejoining (not anastomosing) 46. P. adnatum Kunze
- cc. Veins some of them rejoining dd.

- dd. Pinnae widened or at least not narrowed at base, truncate, sessile 58. P. Kunzeanum C. Chr.
- dd. Pinnae gradually narrowed at base, with long slender tips but sometimes blunt, 17-30 mm wide, 13-22(-32) cm long; growing on ground ee.
- ee. Scales of rootstock lanceolate, dark-brown in center, margin straw-colored; side-veins not straight 71. P. triseriale Sw.
- ee. Scales of rootstock dark-brown, some orbicular, others lanceolate-subulate; principal side-veins straight, parallel; pinnae merely acuminate; stipe 20-60 cm long 53. P. fraxinifolium Jacq.
- N. Lowest segments attached to axis (rachis) by tissue wider than midrib, sometimes widened just above base, usually widened not narrowed at base ff. cp. p. 10
- ff. Lowest segments less than 10 mm long, usually less than 1/2 as long as longest gg. cp. p. 17
- gg. Axis glabrous or almost glabrous beneath, not scaly; longest segments 1-4 mm wide at base hh. cp. p. 13
- hh. Rootstock without scales; pinnae close, touching, ciliate, the longest 2-3 mm wide, 7-20 mm long; hairs of stipe spreading; frond pendant 124. G. Alfarii (Donn. Smith) Morton
- hh. Rootstock with scales at least at tip ii.
- ii. Segments rarely less than their width apart, ascending, 2 mm wide, 3.5-4 cm long; sori projecting beyond margin; segments decurrent on margin; cp. p. 9 131. G. capillaris (Desv.) Seymour
- ii. Segments rarely more than their width apart, sometimes not decurrent on axis jj.
- jj. Longest segments 0.2-3.5 cm long kk.
- kk. Longest segments wider than long, 4 mm wide at base, 2-3 mm long 150. G. moniliformis (Lagasca) Proctor
- kk. Longest segments longer than wide ll.
- ll. Longest segments 1.5 mm wide, 7-9 mm long, their own width apart, obtuse; rootstock densely scaly at tip, its scales 3-3.5 mm long; hairs of stipe short; sori not sunken; stipes clustered 146. G. leptostoma (Fée) Seymour
- ll. Longest segments 2-2.5(-5) mm wide, 10-12(-25) mm long mm.
- mm. Longest segments 3-3.5(-5) mm wide nn.

- nn. Longest segments 10-12 mm long; rootstock 4 mm thick, with grayish, inconspicuous chaff; stipes with long, dense hairs; blades 1-2 cm wide 156. G. rigens (Maxon) Proctor
- oo. Longest segments 19-25 mm long oo.

 - oo. Segments 3 mm wide; blades 5 cm wide; scales of rootstock 1-1.5 mm long; stipes becoming glabrous, not jointed to rootstock; rootstock short, erect
 - 165. G. Tmesipteris (Copel.) Seymour

- oo. Segments 5-6 mm wide; blades 4-4.5 cm wide; stipes glabrous, lustrous, jointed to rootstock; rootstock long-creeping
- 50. P. dasypleuron Kunze

- mm. Longest segments 2-2.5 mm wide, 10-12 mm long
- pp. Hairs of stipe 1-1.7 mm long; sori not sunken; blades 15-20 cm long; stipes 4-7 cm long; axis black; scales of rootstock 8 mm long
- 168. G. vernicosa (Copel.) Morton

- pp. Hairs of stipe none or minute; scales of rootstock 1 mm long; sori conspicuously sunken qq.
- qq. Hairs of stipe minute; segments obtuse; stipes 1-3 cm long, clustered
- 141. G. isidrensis (Copel.) Seymour
- qq. Hairs of stipe none; segments acute, glabrous; stipes 0-2 cm long; scales of rootstock grayish-brown
- 160. G. subcapillaris (Christ) Seymour

- jj. Longest segments 5-14 cm long rr. cp. p. 12

 - rr. Lowest pinnae deflexed; scales of rootstock acute or rounded 1. P. Alfredii Rosenst.
 - rr. Lowest segments not deflexed, reduced to mere wings; segments rarely more than their width apart ss.

- ss. Segments toothed, ascending; axis sparsely puberulent; stipes 1-2 cm long, glabrous; scales of rootstock 1 mm long ¹⁵¹. G. nudipes (Copel.) Seymour
- ss. Segments entire, horizontally spreading; axis glabrous; longest segments 2.5 mm wide, 2 cm long; stipes 5 cm long ¹³². G. carnosula (Christ) Seymour

- gg. Axis hairy beneath or scaly or both, sometimes chaffy tt. cp. p. 12
- tt. Segments with scales beneath; scales sometimes sparse; longest segments (1-)2-9 mm wide at base, 1-2.8 cm long; lowest pinnae not always less than 1/2 as long as longest pinnae uu. cp. p. 14

- uu. Segments distant, connected by narrow wing; distance between segments about 3 times their width; longest segments 2-3 mm wide, 1.5-2 cm long 161. G. subsessilis (Baker) Morton
- uu. Segments close together; stipes tufted vv.
- vv. Longest segments 2-5 times as long as wide ww.
- ww. Axis and surfaces pilose, scaly; stipes 1-3 cm long; lowest pinnae 2 mm long; scales sparse on pinnae beneath 144. G. lanigera (Desv.) Morton
- ww. Axis with long stiff reddish hairs; stipes 5-10 cm long; segments 7-8 mm wide, long hairs on margin, the longest segments 25-28 mm long, spreading almost horizontally 133. G. Chrysleri (Proctor) Seymour
- vv. Longest segments 6-12 times as long as wide; scales abundant on segments beneath xx.
- xx. Stipes (5-)10-22 cm long; scales of rootstock round to triangular-ovate, closely appressed, white-margined 36. P. myriolepis Christ
- xx. Stipes 0.3-5 cm long; scales of rootstock attenuate, spreading or ascending; segments 2-4 mm wide, 1-3 cm long yy.
- yy. Scales of rootstock toothed, spreading 34. P. Bombycinum Maxon
- yy. Scales of rootstock entire, ascending; segments 93-141 27. P. furfuraceum C. & S.
- tt. Segments without scales beneath; lowest pinnae much reduced
- zz. cp. p. 13
- zz. Hairs of axis long, at least some of them 0.5-2.5 mm long; shorter hairs also sometimes present Aa. cp. p. 16
- Aa. Segments acute to attenuate at tip; stipes (2-)4-20 cm long or shorter Ab.
- Ab. Surfaces of pinnae glabrous Ac.
- Ac. Lime-dots on upper surface; pinnae 4 mm wide, horizontal; axis hirsute above, glabrous beneath; stipes clustered, 10-15 cm long, with long spreading hairs 158. G. semihirsuta (Klotzsch) Morton
- Ac. Lime-dots lacking; stipes distant, 1-6(-8) cm apart, almost without hairs 60. P. loriciforme Rosenst
- Ab. Surfaces of pinnae hairy, at least beneath; lime-dots lacking Ad.

- Ad. Pinnae 1 cm wide at base, 20-46 mm long, 1-13 pairs; stipes not distant 145. G. Lehmanniana (Hieron.) Morton
- Ad. Pinnae 2-2.5 mm wide, 13-19 mm long, about 35 pairs, about their width apart; midveins black; stipes clustered 139. G. firma (J. Smith) Morton
- Aa. Segments blunt, longest ones 1-11 mm wide, 0.3-7.5 cm long, 2-11 times as long as wide Ae.
- Ae. Segments glabrous or with very few occasional hairs Af.
- Af. Longest segments 1-1.5 mm wide, 3-5 mm long, 1.5-4 times as long as wide 127. G. anfractuosa (Kunze) Proctor
- Af. Longest segments 2-8(-11) mm wide, 8-30(-75) mm long, almost horizontal, with few hairs Ag.
- Ag. Stipes short or almost none; longest segments 5-11 mm wide, 20-75 mm long 5. P. consimile Mett.
- Ag. Stipes 2-5 cm long; longest segments 2-3 mm wide, 1-1.5 cm long, glabrous above 164. G. taxifolia (L.) Proctor
- Ae. Segments densely to moderately hairy; hairs sometimes fine Ah.
- Ah: Longest segments 7-13 mm long, 4-5 mm wide at base, rounded or subscute at tip, with interval between them; stipes 10-23 cm long (3-6 cm on young plants) 129. G. asplenifolia (L.) Seymour
- Ah. Longest segments 1.5-4 mm wide at base, at least twice as long as wide, setose beneath; sporangia glabrous Ai.
- Ai. Segments joined to axis on upper as well as lower side; longest segments 1.5-2.5 mm wide Aj.
- Aj. Segments hairy on lower surface only; longest pinnae 4-10 mm long; hairs of pinnae dark-reddish, 1 mm long; sporangia not hairy 143. G. Knightii (Copel.) Seymour
- Aj. Segments hairy on both surfaces Ak.
- Ak. Longest segments 3-4 mm long; hairs of pinnae pale; sporangia hairy 162. G. subtilis (Kunze) Morton
- Ak. Longest segments 6-15 mm long Al.
- Al. Pinnae 1.5-2.5 mm wide, 6-11 mm long; stipes 1-2.5 cm long; rootstock 2-3 mm thick 136. G. delicatula (M. & G.) Seymour
- Al. Pinnae usually with few hairs above Am.

- Am. Growing on rocks or ground; hairs on surfaces and margin many, dark; pinnae obtuse, 1.5-2.5 mm wide, 7-12 mm long; axis dark-setulose above; sporangia naked 153. G. pilosissima (M. & G.) Morton
- Am. Growing on trees; hairs on surfaces and margin pale, few; pinnae 3.5 mm wide, 10 mm long, sporangia with few hairs 156. G. rigens (Maxon) Proctor
- Ai. Segments not joined to axis on upper side An.
- An. Pinnae widened at base on both sides, obtuse, 7-12 mm long; hairs of pinnae brown; stipes clustered Ao.
- Ao. Blade 40 times as long as wide, 16 mm wide, 65 cm long; longest pinnae 5 mm wide at base, 11 mm long; stipes 4 mm long, with long spreading hairs at least at base 125. G. alsophicola (Christ) Seymour
- Ao. Blade about 10-12 times as long as wide; pinnae up to 3 mm wide Ap.
- Ap. Longest pinnae 7 mm long, wide at base, sparsely hairy beneath; blades 1.5 cm wide, 15 cm long; stipes 1-1.5 cm long; midribs hairy above and beneath 134. G. cuencana (Hieron.) Morton
- Ap. Longest pinnae 10-12 mm long, 2-3 mm wide, with few long brown hairs; fronds epiphytic, pendent 142. G. jamesonioides (Fée) Morton
- An. Pinnae widened at base on lower side only; stipes 0.5-3 cm long Aq.
- Aq. Longest pinnae 2.5-3(-4) mm wide, 5-9 mm long, 2-3 times as long as wide; stipes 1 cm long; pinnae narrowed at junction with axis, with long hairs beneath, half joined to axis; epiphytic, pendent 160. G. senilis (Fée) Morton
- Aq. Longest pinnae 8-21 mm long; stipes 1-3 cm long Ar.
- Ar. Longest pinnae 6-9 mm wide, 11-21 mm long; hairs of pinnae few except when young, hairs especially on margin and tip; stipes 1-2 cm long 152. G. paucisora Seymour
- Ar. Longest pinnae 4-5 mm wide at base, 12-15 mm long; stipes 5-15 mm long 135. G. cultrata (Willd.) Proctor
- zz. Hairs of axis short, 0.5 mm long or shorter As. cp. p. 14
- As. Hairs confined to axis, midrib and sometimes margin, not on surface or very sparse there At. cp. p. 17
- At. Longest segments 5-9 mm long, obtuse or rounded at tip; stipes very short; fronds sessile, glabrous 147. G. melanosticta (Kunze) Seymour
- At. Longest segments 1.2-11 cm long Au.

Au. Scales of axis conspicuous Av.

Av. Axis and midvein and stipe brown; scales of axis heart-shaped, many; axis with long scattered hairs, striped with brown; rootstock 3-7 mm thick; segments 1.5-3 mm wide, 12-32 mm long, almost glabrous; veins 1-forked, free 6. P. cupreolepis Evans

Av. Axis and stipe black, without stripes, its scales heart-shaped or hastate; basal segments deflexed; veins 2-forked; longest segments 3-6 mm wide, 23-47 mm long 7. P. dispersum Evans

Au. Scales of axis lacking Aw.

Aw. Segments 14-17 mm long; rootstock about 1 mm thick; stipes 4-5 cm long 128. G. apiculata (Kunze) Seymour

Aw. Segments 2.5-11 cm long; stipes dark, uniformly almost black; longest pinnae 2.5-9 cm long Ax.

Ax. Veins mostly anastomosing except at tip of pinnae; scales of axis, if present, hair-like; pinnae 2-9 mm wide, 2.6-9 cm long; midribs and surfaces puberulous 10. P. pectinatum L.

Ax. Veins free (obscure); longest pinnae 5-7 mm wide, (3-)5-9 cm long Ay.

Ay. Blade essentially glabrous; lowest pinnae 8-14 mm long; cp. p. 18 8. P. eurybasis C. Chr.

Ay. Blade with scattered hairs especially near sori; lowest pinnae reduced to mere wings 12. P. ptilodon Kunze

As. Hairs spread over pinnae beneath Az. cp. p. 16

Az. Axis with triangular scales, not hairy; lowest pinnae reduced to mere wings, not deflexed; scales of rootstock hastate; veins 1-forked 11. P. Plumula H. & B.

Az. Axis without scales, or scales hair-like; longest segments (1-)1.5-9 cm long Ba.

Ba. Pinnae abruptly narrowed to tip or obtuse, otherwise margins parallel Bb.

Bb. Pinnae narrowed between base and tip, the longest 5 mm wide, 2.2 cm long; cp. p. 21 72. P. Wagneri Mett.

Bb. Pinnae not narrowed between base and tip; frond pendent Bc.

Bc. Pinnae 2 cm long; stipes 2-5 cm long 138. G. fabaespora (Copel.) Seymour

Bc. Pinnae 5-8 cm long, 3-5 mm wide at base; stipes 0.5-2 cm long; pinnae long-ciliate, slightly hairy on both surfaces; axis hairy beneath 149. G. mollissima (Fée) Proctor

- Ba. Pinnae gradually narrowed to tip; longest pinnae 2-4 mm wide, 3-9 cm long; axis with acicular hairs Bd.
- Bd. Hairs of axis much less than 0.2 mm long; pinnae 3-7 mm wide, 23-53 mm long 10. P. pectinatum L.
- Bd. Hairs of axis 0.35-0.5 mm long; pinnae 3-8 mm wide, 2-9 cm long . 4. P. camptophyllum Fée
- ff. Lowest segments more than 10 mm long, usually more than 1/2 as long as longest; P. furfuraceum might be sought here Be. cp. p. 12
- Be. Segments distinctly toothed, sometimes shallowly or merely at tip, not lobed, 2-3.5 mm wide, 5-15 mm long Bf.
- Bf. Longest segments 0.2-1.5 cm long Bg.
- Bg. Teeth of segments rounded; frond elongate, 9-19 cm long; segments 2.5 mm wide, 8-9 mm long 137. G. dissimulans (Maxon) Seymour
- Bg. Teeth of segments acute Bh.
- Bh. Stipes long, shaggy; segments serrate at tip, rarely less than 2-4 mm wide, 1.5 cm long 32. P. platylepis Mett.
- Bh. Stipes very short or none, 0-5 mm long; pinnae attenuate from base to tip, much widened at base, 2-3 mm wide, 6-15 mm long; frond 1.5-3 cm wide, 7-17 cm long 163. G. suprasculpta (Christ) Seymour
- Bf. Longest segments 1.5-22 cm long Bi.
- Bi. Pinnae widest above base, narrowed at base, long-tapering at tip Bj.
- Bj. Scales of rootstock closely appressed; pinnae 4-7 mm wide, 3.5-10 cm long, 2-4 times their width apart 30. P. montigenum Maxon
- Bj. Scales of rootstock spreading; basal pinnae 17 mm wide in middle, 17-19 cm long, glandular-hairy on both surfaces; blade divided to axis in upper part as well as below 20. P. Christensenii Maxon
- Bi. Pinnae widest at base or equally wide at base Bk.
- Bk. Axis glabrous, at least narrowly winged; segments 4-8 mm wide Bl.
- Bl. Sori borne on teeth of segments; segments 5-8 mm wide, 8-15(-20) cm long; rootstock ascending to erect; stipes clustered, with long hairs at base. cp. p. 9 154. G. podocarpa (Maxon) Seymour

- Bu. Segments attenuate at tip Bv.
- Bv. Segments long, 10-12 mm wide, 8-21 cm long 52. P. flagellare Christ
- Bv. Segments short, 7-19 mm wide, 3.5-9 cm long; sori lengthened Bw.
- Bw. Sori oblong; pinnae 1-4 pairs 84. P. pleolepis Maxon & Copel.
- Bw. Sori several times as long as wide; cp. p. 3 80. P. Bradeorum Rosenst.
- Bq. Segments more than 15, usually 29-53 Bx. cp. p. 19
- Bx. Stipes distant; veins branching, some of them rejoining, forming areoles near midrib; rootstock creeping, usually long; segments 4-14(-22) mm wide By. cp. p. 21
- By. Pinnae abruptly tipped; tip rounded; rootstock 4.5 mm thick Bz.
- Bz. Distance from midrib to midrib at base 4 mm; rootstock with dense spreading linear red-brown scales 73. P. Wiesbaueri Sod.
- Bz. Distance from midrib to midrib at base 7-9 mm; some veins anastomosing; scales of rootstock not white-margined Ca.
- Ca. Rootstock 4-5 mm thick, its scales dense, spreading, usually persistent; segments rounded at tip 54. P. Gilliesii C. Chr.
- Ca. Rootstock (1)1.5-2.5 mm thick, its scales appressed, often falling; segments acute at tip 67. P. ptilorhizon Christ
- By. Pinnae gradually tapering to tip, rootstock 3-5 mm thick, with many appressed scales Cb.
- Cb. Lowest pinnae much narrowed at junction with axis, 14-40 mm long; rootstock long; cp. pp. 9 & 22 21. P. dissimile L.
- Cb. Lowest pinnae not much narrowed at junction with axis, blunt, not toothed at tip Cc.
- Cc. Scales of rootstock orbicular, white-margined; pinnae 9-13 mm wide, 3.5-7(-10) cm long 62. P. maritimum Hieron.
- Cc. Scales of rootstock reddish, not white-margined; blades 7-30(-50) cm long, 1-5 times as long as wide Cd.
- Cd. Scales of rootstock dense, spreading or recurved, with dark midrib extending beyond blade like awn; rootstock 3-5 mm thick; blades 7-15(-20) cm long, 1-2 times as long as wide; pinnae 3-7 mm wide, (1.5-)4-7 cm long . 33. P. plebejum C. & S.

- Cd. Scales of rootstock appressed, midrib not extending beyond blade; blades 13-36(-50) cm long Ce.
- Ce. Veins anastomosing, forming areoles adjacent to midrib, with included veinlet bearing a sorus; longest pinnae 8-14 mm wide, 5-14(-16) cm long
 59. P. loriceum L.
- Ce. Veins free Cf.
- Cf. Fertile pinnae 2-4 times their width apart, 4-7 mm wide, narrowed toward base; scales of rootstock 1-1.5 mm wide, closely appressed, lance-subulate; axis scaly; scales falling cp. p. 18 . . .
 30. P. montigenum Maxon
- Cf. Fertile pinnae less than 2 times their width apart, the longest 10-12 mm wide at base, widened toward base; scales of rootstock pale, 0.5 mm wide, loose, attenuate; axis glabrous
 69. P. rhodopleuron Kunze
- Bw. Stipes clustered; veins free, i. e. not rejoining; rootstock short or erect Cg. cp. p. 19
- Cg. Longest segments 11-21(-24) mm wide; midrib of pinnae glabrous Ch.
- Ch. Longest pinnae 3-6 mm wide, 2-5 cm long, long hairs on margin
 131. G. atroviridis (Copel.) Seymour
- Ch. Longest pinnae 14-21(-24) mm wide, 11-18(-24) cm long, no hairs on margin . . . 57. P. Kuhnii Fourn.
- Cg. Longest segments 1.5-10 mm wide at widest point Ci.
- Ci. Distance from midrib to midrib at base 10-21 mm Cj.
- Cj. Longest segments about 5 cm long, about 6 times as long as wide; rootstock short, dark; stipe narrowly winged . . 28. P. leucosticton Kunze
- Cj. Longest segments 4.5-14.5 cm long, about 12 times as long as wide, 4-9 mm wide
 3. P. bolivianum Rosenst.
- Ci. Distance from midrib to midrib at base of segments 2-10 mm; longest segments 1-7 cm long Ck.
- Ck. Segments gradually tapering or acute or tip, the longest 4-6 mm wide, 1.5-6 cm long; stipes 20-25 cm long, glabrous or with long hairs at base; scales of rootstock dense, brown
 166. G. transiens (Lindm.) Seymour
- Ck. Segments abruptly tipped, rounded Cl.
- Cl. Segments 10-13 mm long
 126. G. ambigens (Copel.) Seymour
- Cl. Segments 2.5-4 cm long, margins almost parallel; stipes pendent, not jointed to rootstock 165. G. Tmesipteris (Maxon) Seymour

- Bn. Axis beneath abundantly hairy or scaly or both, sometimes chaffy Cm. cp. p. 19
- Cm. Segments with scales beneath Cn. cp. p. 23
-
- Cn. Surface of midrib of segments beneath clearly visible Co.
- Co. Segments 4-16 mm wide, 2.6-13 cm long, entire; scales and tomentum beneath segments dense, obscuring surface; segments without hairs, 4-5 mm wide, 2.6-6 cm long, margin turned under; veins netted 35. P. macrolepis Maxon
- Co. Segments acute, longest ones 1-4 mm wide, 1-2.5 cm long, undulate-crenate or serrate; space between segments 1-2 mm; segments 1-3 mm wide, 1.5-2.5 cm long; segments not serrate near tip; stipe much shorter than blade; veins rarely forked near tip . 24. P. cryptocarpon Fée
- Cn. Surface of midrib of segments beneath covered. obscured or hidden by scales or hairs or both Cp.
- Cp. Segments with long hairs or hair-like scales as well as wider scales beneath, their upper surface densely hairy and scaly; segments 3-5 mm wide, 1.5-8 cm long Cq.
- Cq. Midrib not visibly raised; segments 1.5-5 cm long 38. P. Rosei Maxon
- Cq. Midrib visibly raised although covered by scales and hairs; segments 3.5-5 cm long 39. P. sanctae-rosae (Maxon) C. Chr.
- Cp. Segments with no long hairs beneath except sometimes on margin, their scales sometimes elongate; segments blunt, longest ones 2-9 mm wide, 0.8-4 cm long Cr.
- Cr. Stipes clustered; pinnae 93-141, 2-3 mm wide, 12-23 mm long, 1.5-3(-4) mm apart; scales of pinnae orbicular, fringed, with brown center; pinnae white-dotted above 27. P. furfuraceum C. & S.
- Cr. Stipes distant; segments fewer; scales of rootstock closely appressed Cs.
- Cs. Scales of rootstock roundish to triangular-ovate; segments 3-6(-8) mm wide; sori deeply sunken, showing as lumps on upper surface 36. P. myriolepis Christ
- Cs. Scales of rootstock long-acuminate, not roundish; segments blunt Ct.

- Ct. Scales of segments beneath ovate, sometimes with long tip; sori sunken, showing as lumps on upper surface; segments 19-31, 3-6 mm wide, 0.8-2 cm long, 2-8 mm apart 37. P. polypodioides (L.) Watt
- Ct. Scales of segments beneath linear, peltate; sori scarcely sunken; segments 9-19(-21), 5-9 mm wide, (1.8-)2-4 cm long, ciliate 40. P. thyssanolepis A. Br.
- Cm. Segments without scales beneath Cu. Cp. p. 23
- Cu. Axis with triangular scales, no hairs; segments 4 mm wide, 4 cm long, obtuse, lower ones deflexed
 2. P. atrum Evans
- Cu. Axis with hairs, no scales, except inconspicuous scales in P. hygrometricum Cv.
- Cv. Sori longer than wide; segments 10-25 mm wide, 7.5-25 cm long . . 64. P. plectolepidioides Rosenst.
- Cv. Sori round Cw.
- Cw. Segments not ciliate Cx.
- Cx. Hairs on surface abundant, silvery; longest segments 2-5 mm wide, 1-4.5 cm long
 9. P. hygrometricum Splitg.
- Cx. Hairs very few, or fine, or none Cy.
- Cy. Segments hirsute; hairs few, obscure except on axis and midrib; longest segments 3-9(-13) mm wide, 1.1-6.6 cm long
 22. P. Hartwegianum Hk.
- Cy. Segments glabrous or puberulent, widened at base on both sides, with very fine hairs or none on both surfaces, 6-13(-19) mm wide, 2.5-8(4-10.5) cm long; stipes distant, straw-colored . 66. P. plesiosorum Kunze
- Cw. Segments ciliate Cz.
- Cz. Longest segments 1.1-3.5 cm long Da.
- Da. Longest segments 4-5.5 mm wide, 1.1-2.5 cm long; stipes clustered, 10-18 cm long; scales of rootstock attenuate
 148. G. meridensis (Klotzsch) Seymour
- Da. Longest segments 7-8 mm wide, 2.5-3.5 cm long 63. P. mindense Sodiro
- Cz. Longest segments 5-20 cm long Db.
- Db. Hairs or scales on surface of segments; longest segments 8-15 mm wide, 5-12 cm long; scales of rootstock almost black
 49. P. chnoodes Sprengel
- Db. Hairs confined to axis and principal veins Dc.

- Dc. Longest segments 15-18 mm wide, 10-20 cm long; segments crenate, glabrous on surfaces except on veins, at least the lower narrowed at base; stipes 2.5 mm thick, 1.5 cm apart; rootstock 8-10 mm thick 19. P. biauritum Maxon
- Dc. Longest segments 5-6 mm wide, 7-7.5 cm long, 12-14 times as long as wide 8. P. eurybasis C. Chr. var. villosum Evans

SYNOPSIS OF SECTIONS

The division into genera and sections is as in the United States National Herbarium:

Genus <u>Polypodium</u>	Genus <u>Grammitis</u>
Section <u>Polypodium</u>	Section <u>Grammitis</u>
Section <u>Marginaria</u>	Section <u>Xiphopteris</u>
Section <u>Microgramma</u>	Section <u>Cryptosorus</u>
Section <u>Goniophlebium</u>	
Section <u>Pleopeltis</u>	
Section <u>Niphidium</u>	
Section <u>Campyloneurum</u>	
Section <u>Phlebodium</u>	

Synopsis of classification.

- A. Stipes jointed to rootstock; rootstock stout, fleshy, densely scaly; pinnae abscissile from axis; spores monolete, not green; hairs short, septate, glandular or flaccid B.
- B. Veins if branching not rejoining Section Polypodium
- B. Veins anastomosing with included veinlet(s), except in some species of Marginaria C.
- C. Included veinlet 1; blades deeply lobed or pinnate; scales of blade peltate at base; sori in 1 row between midrib and margin D.
- D. Pinnae articulate to axis; veins netted at least sometimes Section Goniophlebium
- D. Pinnae not articulate; veins free or netted Section Marginaria
- C. Included veinlets 2 or more E.
- E. Scales of rootstock peltate at base F.
- F. Sori in 1 row between midrib and margin; scales not ciliate; blades entire; rootstock long-creeping, scaly; P. angustum is an exception in being deeply pinnatifid G.
- G. Fertile narrower or wider than sterile blades Section Microgramma
- G. Fertile and sterile blades usually similar Section Pleopeltis

- F. Sori in 2 or more rows between midrib and margin; scales of rootstock long-ciliate; rootstock short-creeping Section Niphidium
- E. Scales of rootstock not peltate H.
- H. Blades usually entire, rarely pinnate Section Campyloneuron
- H. Blade deeply pinnatifid to wide wing and rounded sinuses; rootstock creeping, stout, scaly; segments entire; veins anastomosing Section Phlebodium
- A. Stipes not jointed to rootstock; rootstock short-creeping or erect; spores trilete, green; hairs spreading, rigid, dark, elongate, 1-celled I. Genus Grammitis
- I. Blades entire, or lobed less than 1/2 way to axis; veins anastomosing with no included veinlets in some species, in others not anastomosing Section Grammitis
- I. Blades deeply lobed or pinnate J.
- J. Vein and sorus 1 in each segment; vein simple or once forked Section Xiphopteris
- J. Veins and sori 2 or more in each segment; veins pinnately branched; P. sectifrons is an exception in having netted veins; bases of blade narrowed Section Cryptosorus

ANNOTATED LIST

Such synonymy is given, as has been necessary to deal with in preparing this article.

The following species are arranged by genera and sections as in the United States National Herbarium.

Genus <u>POLYPODIUM</u> , section <u>POLYPODIUM</u> . Blades pinnate or deeply pinnatifid.			
adelphum	campto-	dissimile	macrodon
aequale	phyllarium	eurybasis	pectinatum
Alfredii	Christensenii	fissidens	Plumula
atrum	consimile	fraternum	ptilodon
bolivianum	cupreolepis	Hartwegianum	subpetiolatum
	dispersum	hygrometricum	ursipes

For fuller information of the following species, see Evans, Interspecific Relationships in the Polypodium pectinatum-plumula complex, Ann. Mo. Bot. Gard. 55:193-293. 1968.

1. P. Alfredii Rosenst., Fedde Repert. 22:15. 1925.

Mexico, Guatemala, Honduras (GH), Costa Rica (GH).

2. P. atrum Evans, Ann. Mo. Bot. Gard. 55:237. 1968.

Mexico (GH), British Honduras (GH), Guatemala, Honduras (GH).

Genus POLYPODIUM, section POLYPODIUM.

3. P. bolivianum Rosenst., Fedde Repert. 5:236. 1908.
P. Carpinterae Rosenst., Fedde Repert. Nov. Sp. 22:16. 1925.
S. Mexico, Guatemala (US), Honduras (US), Costa Rica (US),
Panama (GH, US), n. S. A.
4. P. camptophyllum Fee, Mem. Foug. 8:86. 1857.
Holotype: Colombia, Norte de Santander, Schlim 128 (P); iso-
types (BR, G, K). The only var. known in Central America is
var. camptophyllum. Costa Rica, Panama, W.I., s. Brazil.
5. P. consimile Eaton, Mem. Amer. Acad. n. s. 8:198. 1860.
The only var. known in Central America is var. consimile.
Some specimens of this species were previously ident. as P.
Plumula. Main axis either hairy or nearly glabrous. Pinnae
5-11 mm wide, 2-7.5 cm long, "obtuse to rounded". PLATE 2
Guatemala (GH, US), Costa Rica (GH, US), Panama, W. I., Ven-
ezuela, Colombia.
Nicaragua, Madregara, Mt. Liveco, Atwood 3027 (VT).
6. P. cupreolepis Evans, Ann. Mo. Bot. Gard. 55:224. 1968.
Holotype: Costa Rica, Brade & Brade 697 (S-PA); isotype (US).
Some specimens originally ident. P. Plumula or P. pulchrum.
Mexico, Guatemala (GH, US), Honduras (US), Salvador (US),
Costa Rica (GH).
Nicaragua, Dept. Matagalpa, Sta. Maria de Ostuma, WMW
23364 (US), 23475 (US).
Hill, Dept. Jinotega, 1/4 mile N of Jinotega, alt. ca. 3500
ft., Howard 79 (US).
Dept. Rio San Juan, San Bartolo, Seymour 6193 (ENAG,
SEY, SMU, BM, GH, F, MO, UC, NY, WDP).
7. P. dispersum Evans, Amer. Fern Journ. 58:173. 1968.
Commonly distributed as P. elasticum or P. Plumula.
Florida (FLAS), Mexico, British Honduras (GH), Guatemala (GH,
US), Honduras (GH, US), Costa Rica (GH), W. I., n. S. A.
8. P. eurybasis C. Chr., Kungl. Srolask Vetens. Akad.
Handl. III, 16 (2):71, t. 16, f. 12-13. 1937. Lowest pinnae 8-15
mm long or longer. Pinnae without scales. Scales of axis in-
conspicuous. The following key is adapted from Evans, Ann. Mo.
Bot. Gard. 55:243, 1968.
- a. Axis densely villous; scales of rootstock entire
. var. villosum Evans
- a. Axis subglabrous to thinly pilose; scales of rootstock entire
to inconspicuously fimbriate b.
- b. Veins 1(-2)-forked; segments straight, crenate or crenu-
late; scales of rootstock red-brown. inconspicuously fim-
briate var. glabrescens (Rosenst.) Evans
- b. Veins 2-forked; segments straight or drooping at tip, crenu-
late; scales of rootstock dark red-brown, entire to incon-
spicuously fimbriate var. eurybasis

Genus POLYPODIUM, section POLYPODIUM, cont.

Var. eurybasis. Costa Rica (FLAS). Var. glabrescens (Rosenst.) Evans, l. c., p. 244. Costa Rica (GH, US) to Bolivia. Var. villosum Evans, l. c. p. 245. Costa Rica (FLAS, US), Canal Zone (US) to Bolivia.

9. P. hygrometricum Splitgb., Tijdschr. Nat. Gesch. 7:409. 1840. P. truncatulum Rosenst., Fedde Repert. 9:343. 1911 as var. of P. hygrometricum. Segments 2-5 mm wide, 10-45 mm long. Commonly ident. originally as P. truncatulum Rosenst. S. Mexico, Guatemala (US), Honduras (US), Costa Rica (GH, MO, US), Panama (GH, US) to w. Bolivia.

Nicaragua, Sierras de Managua, Piesal Pacifico, Chaves? 1089. (US): Chaves 7, ident. originally as P. pectinatum L. var. truncatum Rosenst.

10. P. pectinatum L., Sp. Pl. 2:1085. 1753.

For fuller description, see Maxon, Flora of Porto Rico and the Virgin Islands 6:412. 1926. Illustrated: Lasser, Flora de Venezuela 1(2): t. 185. 1969. Florida (FLAS), British Honduras (GH), Guatemala (GH), Honduras (GH), Costa Rica (GH), Panama (GH), W. I., n.w. S. A. Costa and surfaces "puberulous". Evans.

11. P. Plumula H. & B. ex Willd., Sp. 5:178. 1810.

P. elasticum Rich. ex Desv. 1827, non Bory ex Willd. 1810.

P. pulchrum M. & G., Mem. Act. Brux. 15:41, t. 8, f. 2. 1842.

Photo of type (GH). Many specimens formerly det. P. pectinatum have been corrected to this species by Evans. Axis and midribs black. Scales of rootstock triangular, lustrous, red-brown. P. Plumula may be distinguished from a very similar species, P. dispersum, as follows:

A. Basal segments not deflexed; veins 1-forked . . . P. Plumula

A. Basal segments deflexed; veins 2-forked . . . P. dispersum

Florida (FLAS), Mexico, British Honduras (US), Guatemala (GH), Honduras (US), Salvador (GH, US), Costa Rica (GH, US), Panama, W. I., n. S. A.

Nicaragua, between Jinotega and Matagalpa, Bunting & Licht 973 (GH).

Boaco, Atwood 3820 (SEY, GH).

PLATE 3

12. P. ptilodon Kunze, Linnaea 9:42. 1834.

The only var. known in Central America is var. caespitosum (Jenman) Evans, Amer. Fern Journ. 58:170. 1968. Many specimens of this species, det. Evans, were formerly det. P. pectinatum. Florida (FLAS), e. Mexico, Honduras, Greater Antilles.

Genus POLYPODIUM, section POLYPODIUM, cont.

For fuller information of the following species, see Maxon, Contr. U. S. Nat. Herb. 8:271-276. 1903.

13. P. adelphum Maxon, Contr. U. S. Nat. Herb. 8:275, t. 62. 1903. Illustrated. Type: Mexico, Chiapas (GH). Guatemala (GH, US). Some specimens of this species were formerly det. P. subpetiolatum.

14. P. aequale Maxon, Contr. U. S. Nat. Herb. 8:273. 1903. Guatemala (GH).

15. P. fissidens Maxon, Contr. U. S. Nat. Herb. 8:275, t. 61, f. 4. 1903. Illustrated. Guatemala (GH, US).

16. P. fraternum C. & S., Linnaea 5:608. 1830. Mexico (FLAS), British Honduras (GH, US), Guatemala (US), Honduras (GH, US), Calif. (FLAS). For fuller information, see Maxon, Contr. U. S. Nat. Herb. 8:276. 1903.

17. P. macrodon Hk., Sp. 4:218. 1862, non Reinw. 1867. P. legionarium Baker in Hook. & Baker, Syn. Fil. 337. 1868. See Maxon, Contr. U. S. Nat. Herb. 8:275. 1903. Guatemala (GH, US), Honduras (US), Costa Rica (US), Canal Zone (US). Nicaragua, San Carlos, Dept. Rio San Juan, Atwood 2019 (ENAG, SEY, SMU, BM, GH, F, MO, UC, NY).

18. P. subpetiolatum Hk. in Bentham, Pl. Hartw. 54. 1840. For description, see Maxon, Contr. U. S. Nat. Herb. 8:271. 1903, also Knobloch & Correll, Ferns of Chihuahua 144. Illustrated p. 136. Costa Rica (GH).

Nicaragua, San Bartolo, Dept. Rio San Juan, Seymour & Robbins 6165 (ENAG, SEY, SMU, BM, GH, F, MO, UC, NY, MICH).

Remaining species of section POLYPODIUM.

19. P. bauritum Maxon, Contr. U. S. Nat. Herb. 13:9. 1909, where fully described. Guatemala (US), Costa Rica (US). The 2 specimens from Guatemala have lowest pinnae as long as any, or damaged so that one cannot tell. The 1 specimen from Costa Rica has lowest pinnae 2.5 cm long as compared to the longest which are 9 cm long. Of all specimens, longest pinnae 9-11 mm wide, 8-11 cm long, attenuate. Guatemala, Costa Rica.

20. P. Christensenii Maxon, Contr. U. S. Nat. Herb. 13:10. 1909, where fully described. Guatemala (US).

21. P. dissimile L., Syst. Nat. ed. 10, 2:1325. 1759. P. sororium H. & B. in Willd., Sp. 5:191. 1810.

For fuller information, see Maxon, Fl. Porto Rico and the Virgin Islands 413. 1926. Guatemala (GH, US), Honduras (GH, US), Costa Rica (GH, US), Panama (GH, US), Jamaica (FLAS). In Ind. Fil. 523, P. dissimile is printed in italics, indicating doubt. P. dissimile Griseb., Fl. British W. Indies, 1864, is given as a synonym of P. sororium. But a later publication by

Genus POLYPODIUM, section POLYPODIUM, cont.
 Maxon in Fl. Porto Rico 6:413. 1926, records P. sororium as
 a synonym of P. dissimile L. Some specimens of this species
 were originally det. P. Plumula.

Stipes "subdistant." Lowest pinnae 19-40 mm long, some-
 times much shorter than the longest; longest pinnae 8.5-14 cm
 long. Pinnae quite separate. Frequent lobing of lower pinnae
 is very distinctive. Nicaragua, Castillo, along La Juana
 River, [Dept. Rio San Juan], Shimek s. n. (MO).

Volcan Mombacho, Dept. Granada, Atwood 3906 (SEY,
 SMU, GH, MO).

PLATE I

22. P. Hartwegianum Hk. in Bentham, Pl. Hartw. 54. 1840.
 For description, see Knobloch & Correll, Ferns of Chihuahua
 140, pl. 44, f. 4. 1962. Pinnae 2-13 mm wide.
 Guatemala (GH), Salvador (US), Costa Rica (US).

23. P. ursipes Moritz, Linnaea 36:135. 1869.
 Lowest pinnae 1.5-2.5 cm long. Costa Rica (FLAS).

Genus POLYPODIUM, Section MARGINARIA. Blades deeply
 pinnatifid or divided to axis. The following species, which are
 free-veined are treated (except P. montigenum) by Maxon,
 Contr. U. S. Nat. Herb. 17:557-579. 1916, q. v. for fuller
 information.

cryptocarpon	furfuraceum	montigenum	platylepis
fallax	leucosticton	murorum	plebejum
Friedrichsthalianum	Lindenianum		

24. P. cryptocarpon Fée, Mem. Foug. 8:88. 1857.
P. Skinneri Hk., Sp. Fil. 4:214, pl. 276 B. 1862. Ind. Fil.
 Corrig. 2:56 and Maxon, Contr. U. S. Nat. Herb. 17:562. 1916.
 make P. Skinneri a synonym of P. cryptocarpon Fée.
 S. Mexico (US), Guatemala (US), Honduras (US).

25. P. fallax C. & S., Linnaea 5:609. 1830. Mexico, Brit-
 ish Honduras (GH), Guatemala (GH), Honduras (GH), Costa
 Rica (FLAS, GH).

26. P. Friedrichsthalianum Kunze, Farnkr. 2:55, t. 123. 1850.
 Illustrated. Guatemala (GH), Costa Rica (GH).
 Nicaragua, Chontales, reported by Hemsley, Biol. Cent. Am.
 111:658.

La Luz-Siuna, Dept. Zelaya, Bunting & Licht 641 (GH).

27. P. furfuraceum C. & S., Linnaea 5:607. 1830.

In Contr. U. S. Nat. Herb. 17:557. 1916. Illustrated as
P. Macbridense Shimek, Bull. Iowa State Univ. 4:200. 1896.
 Stipes shaggy, 1-8 cm long. Mexico, Guatemala, Salvador,
 Costa Rica (FLAS, GH), Panama (GH), Peru. Maxon, Contr.
 U. S. Nat. Herb. 24:60.

Nicaragua, N of Jinotega, Howard 70 (US); E of Jinotega, alt.
 3200 ft., Howard 188 (US).

Genus POLYPODIUM, Section MARGINARIA, cont.

Tuma, Dept. Matagalpa, Seymour 4036 (VT).

Castillo, Dept. Rio San Juan, Shimek, as *P. Macbridense*, Bull. Iowa State Univ. 4:200. 1896.

28. *P. leucostictum* Kunze ex Klotzsch, *Linnaea* 20:380. 1847; non Fée 1852. *P. remotum* Desv., *Prodr.* 232. 1827; non Baker, 1811. Guatemala (GH), Costa Rica (FLAS, GH), n. S. A.

29. *P. Lindenianum* Kunze, *Farnkr.* 2:33, t. 134. 1851. Illustrated. Epiphyte similar to *P. Friedrichsthalianum*. PLATE 4 S. Mexico, British Honduras, Guatemala, Honduras, Costa Rica Nicaragua, Sierra de Managua, hacienda Las Dehisas, Garnier 1459 (GH); 900 m, Grant, 1027 (GH), 1041 (GH).

Siuna, Dept. Zelaya, Atwood 3163 (SEY, SMU, GH, F).

Tuma, Dept. Matagalpa, Seymour & Atwood 4033 (ENAG, SEY, SMU, BM, GH, F, MO, UC, NY, WDP, MICH).

30. *P. montigenum* Maxon, in Yuncker, *Field Mus. Bot.* 17: 306. 1938.

Type: Costa Rica, Maxon & Harvey 8479, 1, 182, 092 (US).

Scales of rootstock closely appressed-imbricate, lance-subulate, 1-1.5 mm wide, 3-5 mm long. Axis deciduously paleaceous. Fertile pinnae linear, 2-4 times their width apart, mostly 4-7 mm wide, acutish, sterile ones closer, wider, 7-10(-15) mm wide near middle, narrowed toward base, attenuate toward tip. Pinnae often toothed irregularly, bluntly. Sori sunken.

Description mostly from Maxon, l. c.

Honduras, Costa Rica, Panama.

31. *P. murorum* Hk., *Ic. Pl.* t. 70. 1837. Illustr. Lasser, *Fl. de Venezuela* 1(2), t. 188. Costa Rica (GH), Colombia, Ecuador.

32. *P. platylepis* Mett. in Kuhn, *Linnaea* 36:137. 1869. Guatemala (GH), Costa Rica (GH). Acc. Maxon, stipes "long, slender, shaggy", tips of pinnae "serrate".

33. *P. plebejum* C. & S., *Linnaea* 5:607. 1830; including var. *Cooperi* Baker, *Journ. Bot.* 25:25. 1887. Sori deeply sunken. Perhaps some varieties are toothed. Those examined are entire. Mexico (MO, US), Guatemala (GH, MO), Honduras (GH, MO), Salvador (GH), Costa Rica (FLAS, GH, MO), Panama (GH). Nicaragua, between Matagalpa and Jinotega, alt. 4000-4500 ft.,

Bunting & Licht 996 (GH).

Summit of Mombacho, alt. 1600 m, Grant 817 (GH).

Sierras de Managua, alt. 800 m, Grant 998 (GH).

Mombacho, Dept. Granada, MHV 7783 (GH); Atwood 3905 (SEY, GH): Marshall & Neill 6725 (ENAG, SEY, SMU, GH, MO): Seymour 6097 (SEY).

Genus POLYPODIUM, section MARGINARIA. Blades deeply pinnatifid. Net-veined species.

Bombycinum myriolepis Rosei thyssanolepis
macrolepis polypodioides sanctae-rosae

For fuller information of the following species, see Maxon, Contr. U. S. Nat. Herb. 17:579-596. 1916.

34.P. Bombycinum Maxon, Contr. U. S. Nat. Herb. 17:592. 1916. Panama (US).

35.P. macrolepis Maxon, Contr. U. S. Nat. Herb. 17:584. 1916. Costa Rica (GH, US), Panama (GH, US).

Sori less deeply sunken than in *P. myriolepis*.

36.P. myriolepis Christ, Bull. Soc. Bot. Belg. 35:224. 1896. Bull. Boiss. 4:661. 1896. For name, see Maxon, Contr. U.S. Nat. Herb. 17:581-2. 1916.

Costa Rica (FLAS, GH, US), Panama (GH, US).

37.P. polypodioides (L.) Watt, Canad. Nat. ser. 2, 3:158. 1867. For fuller information, see Weatherby, Contr. Gray Herb. 124:22-35. 1939. Stipes densely scaly. The following key is adapted from that by Weatherby, l. c. Illustr. Lasser, Fl. de Venezuela 1(2), t. 188.

- a. Scales all strongly finbriate-serrulate; upper surface of blades with scattered scales; veins often almost completely anastomosing b.
 - b. Scales of blades beneath prevailingly ovate to ovate-lanceolate, acute to acuminate var. polypodioides
 - b. Scales of blades beneath with ovate dilated base and conspicuous subulate tip . . . var. Burchellii (Baker) Weath.
- a. Scales of blades beneath entire or only shallowly and minutely serrulate, only part of the veins anastomosing; scales of rootstock somewhat finbriate-serrulate, with blackish sclerotic central band; scales of blades closely appressed; well developed fronds more than 10 cm tall c.
 - c. Upper surface of blades glabrous; scales beneath prevailingly orbicular to deltoid-ovate, obtuse or acute var. Michauxianum Weath.
 - c. Upper surface of blades sparsely scaly; at least some scales beneath, particularly the marginal, with small dilated basal portion abruptly contracted into a long acicular tip var. aciculare Weath.

Var. polypodioides. Mexico, British Honduras, Nicaragua, Costa Rica, W. I., Venezuela.

Var. aciculare Weath., Contr. Gray Herb. 124:33. 1939.

Mexico (FLAS), British Honduras (US), Guatemala (FLAS, GH, US), Honduras (GH, US), Salvador (GH, US), Costa Rica (GH, US), Panama (GH, US).

Genus POLYPODIUM, Section MARGINARIA, cont.

Var. Burchellii (Baker) Weath., Contr. Gray Herb. 124:29. 1939. British Honduras (GH), Guatemala (GH), Honduras (GH), Costa Rica (GH), Panama (GH), n. S. A. Weatherby reports it in n. S. A. only.

Nicaragua, Omotepic, [Dept. Rivas], Wright (GH).

Managua, Chaves ? 44 (A).

Hacienda El Rodeo, 15 km from Managua, Garnier 1457 (GH)

Hacienda El Crucero, sierra de Managua, Garnier 1423 (GH).

San Cristobal, Garnier 1926 (GH).

Granada, low hills, MHV 7621 (GH).

Mt. Mombacho, slopes of, [Dept. Granada], alt. 400 m, Grant 784 (GH).

Boaco, Atwood 1416 (VT); 3837 (NY, WDP, WIS); Moore 1456 (SEY, SMU, GH).

Acoyapa, Dept. Chontales, Nichols 1722 (GH, VT).

Bluefields, Dept. Zelaya, Nichols 894 (GH, VT).

Granada, MHV 7621 (GH, US), cited by Weatherby.

Puerto Cabezas, Dept. Zelaya, Seymour 5931 (ENAG, SEY, SMU); Marshall & Neill 6583 (ENAG, BM, GH, F, MO, UC, NY, WDP, MICH).

Waspan, Comarca del Cabo, Atwood 3812 (VT).

Madregara, Mt. Liveco, Atwood 3035 (SEY, SMU).

Siuna, Dept. Zelaya, Seymour & Atwood 3285 (SEY).

Corn Island, Atwood 4323 (ENAG, SEY, BM, GH, F, MO).

Var. Michauxianum Weath., Contr. Gray Herb. 124:31. 1939. S. United States, Mexico, Guatemala (GH), Costa Rica (GH), Panama (GH).

38. P. Rosei Maxon, Contr. U. S. Nat. Herb. 17:594. 1916. Honduras (GH).

39. P. sanctae-rosae (Maxon) C. Chr., Ind. Fil. Suppl. I, 62. 1913. Goniophlebium sanctae-rosae Maxon, Contr. U. S. Nat. Herb. 13:8. 1909, where fully described. Guatemala, Salvador. Nicaragua, N of Jinotega, Howard 68 (US).

40. P. thyssanolepis A. Br. ex Klotzsch, Linnaea 20:392. 1847. For description, see Knobloch & Correll, Ferns of Chihuahua 144. Guatemala (GH, US), Honduras (GH, US), Costa Rica (GH, US), W. I. (FLAS). Illustr. Lasser, Fl. de Venezuela 1(2), t. 193.

Genus POLYPODIUM, section MICROGRAMMA. Blades entire.

ciliatum Palmeri piloselloides

lycopodioides persicariaefolium tectum

41. P. ciliatum Willd., Sp. 5:144. 1810. Illustr. Lasser, Fl. de Venezuela 1(2), t. 182.

Genus POLYPODIUM, section MICROGRAMMA, cont.
British Honduras (US), Guatemala (GH), Honduras (GH), Costa
Rica (FLAS, GH), Panama (GH, US).

Nicaragua, Sangsanta District, Schramm 32 (US).

Siuna, Dept. Zelaya, Atwood 3110 (VT).

Rama, Dept. Zelaya, Nichols 586 (VT).

Bluefields, Dept. Zelaya, Molina 2061 (US).

42. P. lycopodioides L., Sp. Pl. 2:1092. 1753.

P. salicifolium Willd., Sp. Pl. 5:149. 1810, non Vahl 1807.

Phymatodes prominula Maxon, Contr. U. S. Nat. Herb. 10:

501. 1908. Polypodium prominula C. Chr., Ind. Fil. Suppl.

I, 61. 1913. Type: Venezuela, Margarita, Johnston 155 (US).

For fuller description, see Maxon, Fl. Porto Rico 6:417.

1926. Illustr. Lasser, Fl. de Venezuela 1(2), t. 182. 1969.

British Honduras, Guatemala (FLAS), Honduras, Costa Rica

(FLAS), Panama (GH, US), Trinidad, Venezuela.

Nicaragua, Greytown, [San Juan del Norte], Wright, s. n. (US).

Mosquito Coast, [Dept. Zelaya], Schramm (US).

Bragman's Bluff, [Dept. Zelaya], Engelsing (US).

Bluefields, Dept. Zelaya, Nichols 382 (GH, VT).

Rama, Dept. Zelaya, Atwood & Moore 467 (SEY, F, GH).

Volcan Mombacho, Dept. Granada, Robbins 6098 (SEY).

Rama, Dept. Zelaya, Nichols 585 (ENAG, SMU, GH, MO,

NY, BM); 903 (VT).

Puerto Cabezas, Dept. Zelaya, Marshall & Neill 6584

(ENAG, SEY, SMU, BM, F, MO, UC, NY).

San Juan del Norte (Greytown), Atwood 5234 (SEY, GH).

Greytown, [Dept. Rio San Juan], Wright, s. n. (GH, US).

Castillo, [Dept. Rio San Juan], reported by Shimek.

Between Greytown & Delta, [Dept. Rio San Juan], Bunting
& Licht 864 (GH).

43. P. Palmeri Maxon, Contr. U. S. Nat. Herb. 17:600. 1916.
Rootstock 3-5 mm thick, its scales pale toward tip, 6-8 mm
long. Some specimens formerly det. P. lycopodioides.

Mexico (GH, US), British Honduras (GH, US), Guatemala (GH,

US), Honduras (GH, US), Costa Rica (GH), Panama (GH).

Nicaragua, Greytown, [Dept. Rio San Juan], Wright s. n. (GH,
US); Smith 2044 (GH, US).

Sapoa, Dept. Rivas, Atwood 1889 (SEY).

Corn Island, Atwood 4261b (SEY, GH, F).

44. P. persicariaefolium Schrader, G&tt. Gel. Anz. 867. 1824.
Panama (US). Illustr. Lasser, Fl. de Venezuela 1(2), t. 183.

Genus POLYPODIUM, section MICROGRAMMA, concl.
 Nicaragua, Puerto Cabezas, Dept. Zelaya, Seymour 5930
 (ENAG, SEY, SMU, BM, GH, F, MO, UC, NY, WDP, MICH).
 Corn Island, Dept. Zelaya, Atwood 4261a (SEY, GH).

45. P. piloselloides L., Sp. P. 2:1083. 1753. For fuller information, see Maxon, Fl. Porto Rico 6:413. Illustr. Lasser, Fl. de Venezuela 1(2), t. 180. Guatemala (GH).

46. P. tectum Kaulfuss, Enum. 87. 1824.
P. blandulum Christ, Bull. Boiss. II, 7:259. 1907.
 Costa Rica (GH, US), Panama (GH).

Genus POLYPODIUM, section GONIOPHLEBIUM.

Blades usually deeply pinnatifid or pinnate.

adnatum	fraxinifolium	loriciforme	rhachypterigium
attenuatum	Gilliesii	Lowei	rhodopleuron
chnoodes	glaucophyllum	maritimum	sessilifolium
dasypleuron	hispidulum	mindense	triseriale
falcoideum	Kuhnii	pectolepidiodes	
flagellare	Kunzeanum	pectolepis	Wagneri
	loriceum	plesiosorum	Wiesbaueri
		ptilorhizon	

47. P. adnatum Kunze in Klotzsch, Linnaea 20:395. 1849.
 This species has more rows of sori than P. triseriale, according to Dr. D. B. Lellinger, private correspondence.
 Guatemala, Panama (US), n. S. A.

Nicaragua, "Camp Seven", reported by Shimek.

48. P. attenuatum H. & B. in Willd., Sp. 5:191. 1810.
P. gladiatum Kunze, Linnaea 9:45. 1834.

Stipe 15-30 cm long, glossy, naked. Axis and pinnae without hairs. Longest pinnae 9-18 mm wide, 10-15 cm long; lowest pinnae scarcely shorter. Sori in 1-2 rows.

Mexico (GH), Cuba (FLAS).

Nicaragua, Las Sierras de Managua, alt. 1000 ft., Chaves 23 (GH).

Granada, reported by Fournier, Bull. Soc. Bot. Fr. 17: 237. 1870.

49. P. chnoodes Sprengel, Neu Entdeck 3:5. 1822.
 For description, see Maxon, Fl. Porto Rico 6:414. 1926.
 Guatemala (GH, US), Honduras (GH, US), Costa Rica (GH, US), Panama (GH, US), W. I. (FLAS).

Nicaragua, Sangsangte, Segovia District, Schramm 16 (US).

Chontales, reported by Hemsley, Biol. Cent. Am. 3:656. 1885-1886.

50. P. dasypleuron Kunze, Linnaea 9:43. 1834. Stipes glabrous; segments with long hairs on surface beneath. Longest segments 5-6 mm wide, 17-23 mm long. Panama (US).

Genus POLYPODIUM, section GONIOPHLEBIUM, cont.

51. P. falcoideum Kuhn, Hieron., Engl. Jahrb. 34:533. 1904. Blades entire. Costa Rica (GH, US), Panama (GH, US).
 52. P. flagellare Christ, Bull. Boiss. 4:660. 1896. Costa Rica (US), Panama (GH, US).
 53. P. fraxinilolium Jacq., Coll. 3:187. 1789. Illustr., Lasser, Fl. de Venezuela 1(2), t.198. 1969. P. fluminense Vell., Fl. Flum. 11, t.66. 1827, non Grammitis fluminensis Fée. Guatemala (GH, US), Costa Rica (FLAS, GH, US), Panama (GH). Nicaragua, Santo Domingo, Dept. Chontales, Atwood 3326 (SEY, SMU, GH, F).

Bluefields, Dept. Zelaya, Atwood 4156 (VT).

54. P. Gilliesii C. Chr., Ind. Fil. 529. 1906. P. pubescens Gillies ex Hk. & Grev., Ic. Fil. t.182. 1830, non L. 1759 nec alior. Characters in key given me largely by D. B. Lellinger. For description, see Capurro, R. H., Fl. de la Provincia de La Buenos Aires 4:232. 1968. Costa Rica (US), S. A. (GH).
 55. P. glaucophyllum Kunze in Klotzsch, Linnaea 20:393. 1847. Exceptional for this section in having entire blades. Illustr., Lasser, Fl. de Venezuela 1(2), t.183. 1969. Costa Rica (FLAS, GH, US, USF), Panama (US).

56. P. hispidulum Bartlett, Proc. Amer. Acad. 43:48. 1907. Type: (GH). Mexico (MO, Guatemala (GH, US), Honduras (US).

57. P. Kuhnii Fourn., Bull. Soc. Fr. 19:251. 1872. Costa Rica (FLAS, GH, MO, US), Panama (GH, US). Nicaragua, Ometepe, reported by Fournier, Sertum Nic. 251; and Hemsley, Biol. Cent. Am. 111:661.

Volcan Mombacho, Dept. Granada, Robbins 6252 (SEY).

Santiago Volcano, Dept. Masaya, Maxon 7659 (US).

San Bartolo, Dept. Rio San Juan, Seymour 6179 (SEY).

58. P. Kunzeanum C. Chr., Ind. Fil. 536. 1906. Panama (US).

59. P. loriceum L., Sp. Pl. 2:1086. 1753. P. laetum Raddi, Opusc. Sci. Bol. 3:287. 1819. = P. loriceum var. For description, see Maxon, Fl. Porto Rico 6:414. 1926. Illustr., Lasser, Fl. de Venezuela 1(2), t.204. 1969. Often confused with P. ptilorhizon from which it can be distinguished as follows:
 A. Stipes 5-9 cm long; longest segments 7-12 mm wide, (3-) 4.5-9.5(-13) cm long P. loriceum L.
 A. Stipes 1.5-2 cm long; longest segments 5-7 mm wide at base, 2.2-2.6 cm long P. ptilorhizon Christ
 Guatemala, Honduras, Salvador, Costa Rica (FLAS), Panama (GH, US, USF), W. I. (FLAS).

Nicaragua, Ometepe, Dept. Rivas, Wright (US).

Between Matagalpa and Jinotega, WMW 23345, 23517, 23525, 24830 (US).

Genus POLYPODIUM, section GONIOPHLEBIUM, cont.

Above and E of Jinotega, WMW 24754 (US).

Santo Domingo, Dept. Chontales, Atwood 3329 (SEY, GH).

Mombacho, Dept. Granada, MHV 7782 (US), 7775 (US).

Bluefields, Dept. Zelaya, Danneberger (US).

Hairs of axis sometimes sparse, sometimes limited to certain spots and seemingly lacking.

60. P. loriceforme Rosenst., Fedde Repert. 22:17. 1925.
Costa Rica (US).

61. P. Loweii C. Chr., Ind. Fil. 326. 1906.
For name, see Maxon, Contr. U. S. Nat. Herb. 13:8. 1909.
Guatemala, Honduras (GH, US), Salvador (US).

62. P. maritimum Hieron., Engl. Jahrb. 34:527. 1904.
Costa Rica (GH, US), Panama (GH, US).

63. P. mindense Sodiro, Cr. Vasc. Quit. 348. 1893.
Costa Rica (GH), Ecuador.

64. P. plectolepidioides Rosenst., Fedde Repert. 10:278.
1912. Costa Rica.

65. P. plectolepis (Fée) Hk., Sp. 5:30. 1863.
Very similar to P. subpetiolatum; they differ in venation.
Guatemala (GH), Costa Rica (US).

66. P. plesiosorum Kunze, Linnaea 18:313. 1844; non P. plesiosoros Hk.f., Trans. Linn. Soc. Lond. 20:166. 1847.
Illustrated, Lasser, Fl. Venezuela 1(2): t.199. 1969.
Stipes distant. Veins anastomosing near margin. Stipes straw-colored, glabrous, 10-20 cm long. Mexico (FLAS, US), Honduras (US), Salvador (GH, US), Costa Rica (GH, US), Panama (GH).
Nicaragua, Granada, reported by Fournier, Sertum Nic. 251,
as P. anisomeron Fée var.

Las Nubes, S of Managua, alt. 800-900 m, MHV 7510 (US).
Sta. Maria, [Dept. Matagalpa], WMW 23537 (US), 24779 (US).

67. P. ptilorhizon Christ, Bull. Boiss. II, 5:6. 1905.
Often confused with P. loriceum, q. v.
Costa Rica (FLAS), Panama (GH).
Nicaragua, W of Matagalpa, WMW 24057 (US).

68. P. rhachypterygium Liebm., Vid. Selsk. Skr. V, 1:191. 1849. P. Synammia (Fée) C. Chr., Ind. Fil. 328. 1906.
Illustrated in Maxon, Contr. U. S. Nat. Herb. 16:61. 1912.
Guatemala (US), Honduras (MO).

69. P. rhodopleuron Kunze, Linnaea 18:315. 1844.
Pinnae entire or with long low teeth.
Salvador (US), Costa Rica (GH, MO, US), Panama (GH, US).
Nicaragua, Casa Colorada, alt. 850 m, MHV 7368 (US).

70. P. sessilifolium Liebm., Vid. Selsk. Skr. V, 1:192. 1849; non Hk. 1862. Margins serrate or entire. Costa Rica (GH, US).

Genus POLYPODIUM, section GONIOPHLEBIUM concl.

71. P. triseriale Sw., Schrader Journ. 1800(2):26. 1801.
P. brasiliense Poiret, Enc. 5:525. 1804, is treated in Ind. Fil. Suppl. 3:145 & 161. 1934, as a synonym, although earlier, in Ind. Fil. 514. 1906, treated as distinct.
P. fraxinifolium Jacq., Coll. 3:187. 1789, is treated as a synonym in Ind. Fil. 571. The differences are given in the key. Stipe, axis and pinnae glabrous. In all countries of Central America.

Nicaragua, "Camp Menochal", reported by Shimek as *P. neriifolium* Schkuhr, Bull. Iowa State Univ. 4:198. 1896.

Sierra de Managua, Garnier A-1210 (GH).

Las Nubes, S of Managua, alt. 800-900 m, MHV 7487 (US).

Casa Colorada, 850 m, MHV 7382 (US), 7387 (US).

Santo Domingo, Dept. Chontales, Atwood 3326 (SEY);

Seymour 3379 (VT).

Siuna, Dept. Zelaya, Atwood 3112 (SEY, GH, MO).

Bluefields, Dept. Zelaya, Atwood & Moore 340 (GH, VT).

882 (VT); Nichols 392 (SEY, GH, NY).

Rama, Dept. Zelaya, Nichols 493 (ENAG, SEY, GH, UC);

Zelaya 468 (VT).

72. P. Wagneri Mett., Ann. Sci. Nat. V, 2:255. 1864. In Ind. Fil. Suppl. 3:147 & 161. 1934, *P. costaricense* Christ, Bull. Boiss. 4:660. 1896, is treated as a var.; and *P. flagellare* Christ, Bull. Boiss. 4:660. 1896, is treated as a synonym. Lower pinnae much reduced according to Hk. & Bk. Costa Rica (GH), Panama (GH, US).

73. P. Wiesbaueri Sodiro, Rec. 65. 1883. In Ind. Fil. 574, this species is treated as a synonym of *P. Falcaria* Kunze, 1844. Costa Rica (FLAS, GH).

Nicaragua, Volcan Mombacho, Dept. Granada, Atwood 5452 (VT).

Genus POLYPODIUM, section PLEOPELTIS.

Blades usually entire.

<i>angustum</i>	Brunei	<i>Munchii</i>	<i>percussum</i>
<i>astrolepis</i>	<i>fructuosum</i>	<i>panamense</i>	<i>pleolepis</i>
<i>Bradeorum</i>	<i>lanceolatum</i>	<i>peltatum</i>	

For fuller information of the following species, see Weatherby, The Group of *Polypodium lanceolatum* in North America, Contr. Gray Herb. 65:3-14. 1922.

74. P. astrolepis Liebm., Vid. Selsk. Skr. V, 1:185. 1849. Mexico (GH), British Honduras (GH, US), Guatemala (GH, US), Honduras (GH, US), Salvador (US), Costa Rica (FLAS, US), Panama (US), W. I. (FLAS).

Nicaragua, slopes of Mt. Mombacho, alt. 460 m, Grant 773 (GH).

Sierra de Managua, hacienda El Cardon, 810 m, Garnier 1458 (GH).

Genus POLYPODIUM, section PLEOPELTIS, cont.

Meseta de Managua, Garnier A-1208 (GH).

Casa Colorada and vicinity, S of Managua, alt. 850 m,
MHV 7369 (GH, US).

Las Nubes, MHV 7474 (US).

"Omotemped" [Ometepe], Wright, on same sheet as P.
lanceolatum (GH, US).

Volcan Mombacho, Seymour 6098 (SEY).

Siuna, Dept. Zelaya, Seymour 3286 (ENAG, SEY, GH, F, MO)

75. P. fructuosum Maxon & Weath. ex Weath., Contr. Gray
Herb. n. s. 65:12. 1922.

Guatemala (VT), Costa Rica (FLAS, GH, US), Panama (GH, US).

Nicaragua, Jalapa, Dept. Nueva Segovia, AMN 6781 (ENAG,
SEY, MO).

Sta. Maria de Ostuma, Dept. Matagalpa, Seymour 2160
(SEY, GH).

Volcan Mombacho, Dept. Granada, Robbins 6251 (ENAG,
SEY, SMU, BM, GH, F, MO, UC).

76. P. lanceolatum L., Sp. Pl. 2:1082. 1753.

The following key is abridged from Weatherby, Contr. Gray
Herb. 65:3-14. 1922. Illustr. Lasser, Fl. de Venezuela 1(2) t. 192.

- a. Scales of rootstock 1.5-2 mm long, black with pale margins;
trichomes usually abundant, conspicuous; orbicular scales of
blade beneath sparsely short-denticulate
. var. trichophorum Weath.
- a. Scales of rootstock from black with pale margin to pale-
brown and one-colored; trichomes rarely conspicuous; orbi-
cular scales of blade beneath conspicuously erose-serrulate b.
- b. Blade more or less translucent; veins prominent beneath;
scales of rootstock 1.5-2 mm long, often pale except dark
spot in center var. crassinervatum (Fee) Weath.
- b. Blade opaque; veins sunken or rarely prominent; scales
of rootstock dark in center c.
- c. Stipe terete; larger scales of rootstock 2-4 mm long,
rarely smaller, lanceolate to lance-attenuate
. var. lanceolatum
- c. Stipe flattened; larger scales of rootstock 1.5-2 mm
long, lanceolate or ovate-lanceolate
. var. complanatum Weath.

Var. lanceolatum. Mexico, Costa Rica (FLAS), Panama, W. I.
Nicaragua, without definite locality, Wright (GH).

Near Sta. Maria de Ostuma, Dept. Matagalpa, WMW 23499
(US), 24786 (US); Porter 1218 (GH), 1220 (GH).

Sierras de "Suanaglua", Chaves (US).

N of Jinotega, alt. about 3500 ft., Howard 77 (US).

Ometepe, [Dept. Rivas], Wright (GH).

Genus POLYPODIUM, section PLEOPELTIS, cont.

Var. complanatum Weath., Contr. Gray Herb. 65:8. 1922.
Costa Rica (GH, US), Panama (GH, US).

Var. crassinervum (Fée) Weath., Contr. Gray Herb. 65:8. 1922.
Mexico, British Honduras (GH), Guatemala (GH, US).

Var. trichophorum Weath, Contr. Gray Herb. 65:8-9. 1922.
Mexico, Guatemala (GH, US), Honduras (US), Costa Rica (GH, US).

77. P. panamense Weath., Contr. Gray Herb. 65:13. 1922.
Panama (GH, US).

78. P. peltatum Cav., Descr. 244. 1802.

P. polylepis Roem. ex Kunze, Linnaea 13:131. 1839.

Var. peltatum is densely scaly beneath, not known in Central America.

Var. interjectum Weath., Amer. Fern Journ. 34:17. 1944,
with scales less dense beneath is the only var. known in Central America. Mexico, Guatemala (US).

Section Pleopeltis, cont. The following species are not treated in reference given above.

79. P. angustum (H. & B. in Willd.) Liebm. Vid. Selsk. Skr. V, 1:186. 1849. Exceptional in this section of Polypodium in Central America in having blades deeply pinnatifid with narrow segments. So similar to P. sectifrons Kunze that C. Chr., Ind. Fil. 662, treats P. sectifrons as a var. of P. angustum, whereas other more recent authors put the two into separate genera, - P. angustum into Polypodium and P. sectifrons into Grammitis. Guatemala (GH, US), Honduras (GH, US), Salvador (GH, US). Nicaragua, Sta. Maria, [Dept. Matagalpa], WMW 23539 (US), 24784 (US).

80. P. Bradeorum Rosenst., Fedde Repert. 10:279. 1912. Exceptional for this section of Polypodium in Central America in the blades being sometimes entire, sometimes pinnate, or pinnatifid.
British Honduras (GH), Costa Rica (GH, US).

Nicaragua, Sangsanta, Segovia District, Schramm 22 (US).

81. P. Brunei Werckle in Christ, Bull. Soc. Bot. Genève II, 1:221. 1909. Costa Rica, Panama (GH, US).

82. P. Munchii Christ, Bull. Boiss. II, 3:147. 1903. Illustrated, Copel., Am. Fern Journ. 43:16. 1953.
Guatemala (GH, US), Salvador (US).

83. P. percussum Cav., Descr. 743. 1802. Illustr., Lasser Fl. de Venezuela 1(2), t. 192. 1969.

British Honduras (GH, US), Guatemala (GH, US), Honduras (GH, US), Costa Rica (FLAS) (US), Panama (US).

Nicaragua, Sta. Maria, Dept. Matagalpa, WMW 2334 (US).

Masuqua [Managua?], Garnier 1826 (GH).

Genus POLYPODIUM, section PLEOPELTIS, cont.

Santo Domingo, Dept. Chontales, Seymour 3380 (VT).

Francia Sirpi, Comarca del Cabo, Atwood 4796 (VT).

Siuna, Dept. Zelaya, Atwood 3117 (VT); Seymour 3286a (VT).

Castillo, Dept. Rio San Juan, reported by Shimek, Bull.

Iowa State Univ. 4:116-224. 1896.

Greytown [San Juan del Norte], Dept. Rio San Juan,

Wright (US).⁻

84. P. pleolepis Max. & Copel. ex Copel., Univ. Calif. Pub. Bot. 19:293, t. 46. 1941. Type: Guatemala, Donnell-Smith 673 (US). Rootstock creeping. Frond pinnate at least at base, with 1-4 pairs of segments. Segments slightly widened at base and adnate. Sori oblong, oblique to axis.

Genus POLYPODIUM, section NIPHIDIUM. Blade entire.

One species in Central America.

85. P. crassifolium L., Sp. Pl. 2:1083. 1753.

Pessopteris crassifolium (L.) Underw. & Maxon, Contr. U. S.

Nat. Herb. 10:485. 1908. For fuller description, see Maxon,

Fl. Porto Rico 6:418. 1926. Illustr. Lasser, Fl. de Venezuela,

1(2), t. 197.

British Honduras (US), Guatemala (FLAS, GH, US), Honduras

(GH), Costa Rica (FLAS, GH), Panama (FLAS, GH, USF).

Nicaragua, Castillo, "Camp Menocal", and Greytown, Dept.

Rio San Juan, reported by Shimek.

Bluefields, Dept. Zelaya, Nichols 390 (ENAG, SEY, MO, GH).^f

Madregara, near Siuna, Dept. Zelaya, Atwood 3031 (VT),
5026 (VT).

Santa Clara, Dept. Nueva Segovia, AMN 6857 (SEY).

Tuma, Dept. Matagalpa, Atwood 4011 (ENAG, SEY, GH).

Santo Domingo, Dept. Chontales, Atwood 3325 (VT).

Genus POLYPODIUM, section CAMPYLONEURUM

Blades usually entire.

anetioides	occultum	sphenodes
angustifolium	Phyllitidis	tuberculidum
coarctatum	Pittieri	tenuipes
costatum	repens	Weatherbyanum
multipunctatum	serpentinum	xalapense

86. P. anetioides Christ, Bull. Soc. Bot. Genève II, 1:219. 1909. Illustrated Copel., Amer. Fern Journ. 43:14, t. 1. 1953, as *Hyalotricha anetioides*. Type: Costa Rica, Candelaria, A. C. Brade 177. Fronds hairy. Exceptional in this genus in stipes not being articulate. Costa Rica (GH), Panama (GH).

Genus POLYPODIUM, section CAMPLYLONEURUM, cont.

87. P. angustifolium Sw., P odr. 130. 1788.

P. ensifolium Willd., Sp. 5:152. 1810.

P. amphostenon Kunze in Klotzsch, Linnaea 20:399. 1847.

P. fulgens Hieron., Hedwigia 48:268. 1909.

For description, see Knobloch & Correll, Ferns of Chihuahua, 135. Illustrated p. 136.

British Honduras (US), Guatemala (GH, US), Honduras (GH, US), Salvador (GH, US), Costa Rica (GH, US), Panama (GH, US, VT), Cuba (FLAS).

Nicaragua, without definite locality, Chaves (US); Garnier 4562 (GH).

Between Jinotega and Matagalpa, 4000-4500 feet, Bunting & Licht 1004 (GH).

Santa Maria, Dept. Matagalpa, WMW 23313 (US), 23596 (US), 24794 (US); Porter 1219 (GH).

Disparate de Potter, Sta. Maria, WMW 25055 (US).

NE of Matagalpa, road to El Tuma, WMW 24053 (US).

Jalapa, Dept. Nueva Segovia, AMN 6782 (SEY).

Tuma, Seymour 4037 (SEY, SMU, GH, F, MO).

Chontales, Levy 1476 (GH); Garnier 1916 (GH).

Mombacho, Garnier 2069 (GH); MHV 7780 (US).

Entrance to Pantasma Valley, 20 miles N of Jinotega, Howard 90 (US).

Castillo, Dept. Rio San Juan, reported by Shimek, Bull. Iowa State Univ. 4:201. 1896.

88. P. coarctatum Kunze, Linnaea 9:39. 1834.

Panama (GH). Stipe 12.5 cm long.

Nicaragua, Wright (GH).

Chontales, reported by Fournier, Sertum Nic. 252 (as Camploneuron) and Hemsley, Biol. Cent. Am. 111:650. 1879.

89. P. costatum Kunze, Linnaea 9:38. 1834; non Mett. 1857; non Hk. 1863.

British Honduras (US), Guatemala (US), Panama (US), W.I. (FLAS).

90. P. multipunctatum Christ, Bull. Boiss. II, 6:51. 1906.

Type: Costa Rica (BM). Photo of type (GH). Costa Rica (US).

"Taches calcaires", limestone spots. "nervures saillantes", nerves prominent.

91. P. occultum Christ, Bull. Boiss. II, 5:7. 1905.

British Honduras (GH, US), Honduras (GH), Costa Rica (GH, US), Panama (GH, US).

Nicaragua, Madregara, near Siuna, Dept. Zelaya, Atwood 3111 (SEY, GH, F, MO, UC).

Genus POLYPODIUM, section CAMPYLONEURUM, cont.

92. P. Phyllitidis L., Sp. Pl. 2:1083. 1753. Illustrated, Lasser, Flora de Venezuela 1(2), t. 197.

a. Stipes none or almost none; blades acuminate or attenuate at tip f. Phyllitidis

a. Stipes definite; blades acute or acutish f. latum (Moore) Proctor

For fuller information see Maxon, Fl. Porto Rico 6:417. 1926. Florida (FLAS), all countries of Central America.

Nicaragua, Sierra de Managua, Rio Las Nubes, Wright (US); Garnier A-1225 (A).

Between Santo Tomas and Villa Soñozo, [Dept. Chontales or Zelaya], Bunting & Licht 1098 (GH).

F. latum (Moore) Proctor, Check List of Jamaican Pteridophytes 49. 1953. Campyloneuron latum Moore.

93. P. Pittieri Christ, Prim. Fl. Costa Rica 3:16. 1901.

Type: (BM). Photo of type (GH). Blades 33 mm wide, 55 cm long. According to original description, side-nerve 5 mm apart. Sori large, in 3 rows. Distinguished especially by very long stipes. Stipes black at base, jointed, solitary, 15 cm long. Costa Rica (GH, US).

94. P. repens Aublet, Hist. Pl. Guian. 2:962. 1775, non Sw. 1788. Illustrated, Lasser, Flora de Venezuela 1(2), t. 201A.

P. brevifolium Lodd. ex Link, Hort. Berol. 2:90. 1833.

Shimek 202 says rootstock more slender than in P. Phyllitidis. British Honduras (GH, US), Guatemala (US), Costa Rica (GH, US), Panama (GH, US). Specimens sometimes det. P. latum at first.

Nicaragua, "Camp Seven", reported by Shimek as P. repens L.

95. P. serpentinum Christ, Bull. Boiss. II, 6:51. 1906.

British Honduras (GH, US), Guatemala (GH), Honduras (GH, US), Costa Rica (GH, MO), Panama (GH, USF).

Nicaragua, Francia Sirpi, Comarca del Cabo, Atwood 4798 (VT).

96. P. sphenodes Kunze ex Klotzsch, Linnaea 20:402. 1847.

See Maxon, Contr. U. S. Nat. Herb. 13:8. 1909.

Costa Rica (FLAS, GH, US), Panama (GH, US).

97. P. sublucidum Christ, Bull. Boiss. II, 7:261. 1907.

Type: Costa Rica, Standley & Valerio 47108 (US).

98. P. tenuipes (Maxon) C. Chr., Ind. Fil. Suppl. 1:63. 1913.

Campyloneuron tenuipes Maxon, Contr. U. S. Nat. Herb. 13:7. 1909, where fully described. Type: Guatemala, Alta Vera Paz, Thürckheim II. 1952 (US).

Genus POLYPODIUM, section CAMPYLONEURUM, concl.

99. P. Weatherbyanum Seymour, nom. nov. Based on Campyloneuron caudatum Fée, Mem. Foug. 8:96. 1857; non P. caudatum Raddi, 1819; non P. caudatum Mett., 1857; non P. caudatum Reinw. ex Salom. 1883. This is named in high esteem for a fern specialist, C. A. Weatherby, who observed that a new name was needed and so annotated a sheet from Guatemala in the Gray Herbarium. "A new name necessary. C. A. W."

100. P. xalapense (Fée) Christ, Bull. Soc. Bot. Belg. 35:231. 1896. Campyloneuron xalapense Fée, Gen. 258. 1850-52. Tip of blade tapering. British Honduras (GH, US), Guatemala (GH, US), Salvador (GH, US), Costa Rica (GH, US), Panama (GH).

Genus POLYPODIUM, section PHLEBODIUM. Blades pinnate or pinnatifid. 2 species in Central America.

101. P. aureum L., Sp. Pl. 2:1087. 1753. Illustr. Lasser, Fl. de Venezuela 1(2), t. 200. 1969. P. leucatomos Poirlet, Enc. 5:516. 1804, a var. of P. aureum. For description, see Knobloch & Correll, Ferns of Chihuahua 137; and Maxon, Fl. Porto Rico 6:419. 1926.

Guatemala (GH, US), Honduras (US), Salvador (US), Costa Rica (GH, US), Panama (GH, US).

Nicaragua, Las Nubes, Dept. Managua?, alt. 800-900 m, MHV 7505 (US).

N of Jinotega, alt. 3500 ft., Howard 86 & 87 (US).

NE of Matagalpa, [Dept. Matagalpa], road to El Tuma, WMW 24058 (US).

El Crucero, Dept. Managua, Atwood & Neill 6747 & 6748 (SEY).

Cuapa, Dept. Chontales, Marshall & Neill 6678 (SEY).

102. P. decumanum Willd., Sp. 5:170. 1810. Illustr. Lasser, Fl. de Venezuela 1(2), t. 201. 1969. For fuller description, see same and Maxon, Fl. Porto Rico 6:419. 1926.

British Honduras (US), Guatemala (US), Honduras (US).

Genus GRAMMITIS, section GRAMMITIS.

Blades usually entire or sometimes shallowly lobed. .

bryophila	marginella	percrassa
crispata	nigro-limbata	trifurcata
jungermanniioides		yarumalensis

Veins anastomosing in G. crispata, G. percrassa and G. yarumalensis. In this respect, they differ from other species of this section.

For fuller information on the following species, see Copeland, The Genus Grammitis, Philip. Journ. Sci. 80:118-131, 253-267. 1951. See also, Maxon, W. R. Grammitis in Ecuador, Contr. U. S. Nat. Herb. 38:85-123. 1967.

Genus GRAMMITIS, section GRAMMITIS, cont.

103. G. bryophila (Maxon) Seymour, comb. nov., based on *Polypodium bryophilum* Maxon, Amer. Fern Journ. 16:7. 1926. Type: Costa Rica, La Palma, road to La Hondura, Maxon & Harvey 7980 (US).

104. G. crispata (J. Smith) Morton, Contr. U. S. Nat. Herb. 38:100. 1967. *Ctenopteris crispata* J. Smith in Seemann, Bot. Voy. Herald 227, pl. 48. 1854. Illustrated. *Polypodium crispatum* (J. Smith) Hk., Sp. 5:1. 1863, non L., Sp. Pl. 2:1080. 1753. *P. goniopteroides* C. Chr., Ind. Fil. 188. 1905; 530. 1906. Costa Rica (FLAS, US), Panama (US), Colombia.

105. G. jungermannioides (Klotzsch) Ching, Bull. Fan Mem. Inst. Biol. Bot. 10:240. 1941. *Polypodium jungermannioides* Klotzsch, Linnaea 20:373. 1847. See Maxon, Proc. Biol. Soc. Wash. 52:116. 1939. Rootstock merely hairy, not scaly. Guatemala (US), Honduras (US), Costa Rica (FLAS, GH, MO, US), Canal Zone (US), Colombia, Jamaica.

106. G. marginella (Sw.) Sw., in Schrader, Journ. 1800²:17. 1801. *P. marginellum* Sw., Prod. 130. 1788. For fuller information, see Copeland, Philip. Journ. Sci. 80:253. 1951; and Maxon, Amer. Fern Journ. 16:819. 1926; and Maxon, Bull. Torr. Club 42:219-228. 1915. Costa Rica (GH, US).

107. G. nigro-limbata Spruce in Hooker, Sp. Fil. IV:164. 1862. *Polypodium nigro-limbatum* (Spruce) Jenman, Bot. Dept. Jamaica Bull. II, 4:69. 1897. *Grammitis fluminensis* Fée, Crypt. Vasc. Bres. 1:85. 1869; non *Polypodium fluminense* Vell., 1827. For fuller information, see Maxon, Bull. Torr. Bot. Club 42:219-225. 1915. Costa Rica (FLAS, US).

108. G. percrassa (Baker) Seymour, comb. nov., based on *Polypodium percrassum* Baker, Journ. Bot. 26:26. 1887. Including *Polypodium Harrisii* Jenman, Gard. Chron. III, 27:241. 1900 and *Polypodium repletum* Christ, Bull. Boiss. II, 7:260. 1907. Copeland in Philip. Journ. Sci. 80:129-131. 1951, treats *G. percrassa*, and *Polypodium enterosoroides* and *P. Harrisii* Jenman as doubtfully distinct from *G. minuscula* (Maxon) Copel. Philip. Journ. Sci. 80:128. 1951. The evident distinctions, even if constant, are not of specific rank.

British Honduras (GH, US), Guatemala (GH, US), Costa Rica (FLAS, US), Panama (FLAS, GH, US). Nicaragua, Bocaycito, Dept. Jinotega, AMN 6897, (SEY, BM, F) as *P. Harrisii* Jenman

109. G. trifurcata (L.) Copel., Gen. Fil. 211. 1947. *Polypodium trifurcatum* L., Sp. Pl. 2:1084. 1753. Type: Martinique, Plumier, Tract. Fil., 138. Veins free. For fuller description, see Maxon, Fl. Porto Rico, 6:410. 1926. Illustr., Lasser, Fl. de Venezuela 1(2), t. 184. 1969.

Guatemala (US), Costa Rica (FLAS, GH, US), Panama (US).

Genus GRAMMITIS, section GRAMMITIS, cont.

110. G. yarumalensis (Hieron.) Proctor, Bull. Inst. Jamaica Sci. Ser. 5:36. 1953. Polypodium yarumalense Hieron., Engl. Jahrb. 34:499. 1904. Type: Colombia, Yarumal, Lehmann 7390; isotype (US). For fuller description, see Maxon, Proc. Biol. Soc. Wash. 52:117. 1939.
Costa Rica (GH, US), Panama, Colombia.

Genus GRAMMITIS, section XIPHOPTERIS. Blades toothed, lobed or pinnate. Sorus 1 on a lobe or pinna.

blepharodes	delitescens	myosuroides	Skutchii
caucana	hyalina	serrulata	trichomanoides
Cookii	Mitchellae	setulosa	truncicola
			zurquina

For fuller information on species of this section, see Copeland, E. B., Amer. Fern Journ. 42:42-52, 93-110. 1952; and Maxon, W. R., Contr. U. S. Nat. Herb. 17:398-406. 1914 and 541-557. 1916; and Morton, C. V., Contr. U. S. Nat. Herb. 38:85-123. 1967.

111. G. blepharodes (Maxon) Seymour, comb. nov., based on Polypodium blepharodes Maxon, Contr. U. S. Nat. Herb. 17:407-408. 1914, where fully described.

Guatemala (GH, US), Costa Rica (FLAS, GH, US), Panama (GH, US), Nicaragua, all stations are in the western part of the country, Sta. Maria, Disparate de Potter, [Dept. Matagalpa], WMW 25011 (US), 25014 (US), 24987 (US), 27621 (US). Sta. Maria, WMW 23447 (US).

Volcan Mombacho, Dept. Granada, Atwood 5453 (ENAG, SEY, SMU, GH, F, MO, UC); AMN 6728 (SEY).

112. G. caucana (Hieron.) Morton, Contr. U. S. Nat. Herb. 38:96. 1967. Polypodium caucanum Hieron., Engl. Jahrb. 34:503. 1904. Illustr., Lasser, Fl. de Venezuela 1(2), t. 180. 1969. Type: Colombia, Rio Digua, Dept. Cauca, Lehmann 3257 (B). Costa Rica (US), Panama (US), British Guiana, Ecuador, Colombia. Nicaragua, no definite locality, Wright (US).

113. P. Cookii (Underw. & Maxon ex Maxon) Seymour, comb. nov., based on Polypodium Cookii Underw. & Maxon ex Maxon, Contr. U. S. Nat. Herb. 17:408. 1914, where fully described. Costa Rica (US).

114. G. delitescens (Maxon) Proctor, Bull. Inst. Jamaica Sci. Ser. 5:32. 1953. Polypodium delitescens Maxon, Bull. Torr. Club 32:74. 1905. Polypodium limula Christ, Bull. Soc. Bot. Genève, ser. 2, 1:218. 1909. Illustr., Lasser, Fl. de Venezuela 1(2), t. 180. 1969 and in Maxon, Contr. U. S. Nat. Herb. 17:404, pl. 12. 1914 and 17:546, pl. 32. 1916, where Maxon does not treat these two names, P. limula and P. delitescens, as synonyms. Copeland treats them as synonyms in Amer. Fern Journ. 42:51-52. 1952.

Genus GRAMMITIS, section XIPHOPTERIS, cont.

Guatemala (GH, US), Honduras (GH, US), Costa Rica (FLAS, GH), Panama (GH, US), Jamaica.

Nicaragua, Sta. Maria, Disparate de Potter, Dept. Matagalpa, WMW 25027 (US).

Bonanza, Dept. Zelaya, AMN 7016 (SEY).

115. G. hyalina (Maxon) Seymour, comb. nov., based on Polypodium hyalinum Maxon, Contr. U. S. Nat. Herb. 17:406. 1914, where fully described. Costa Rica (US).

116. G. Mitchellae (Baker) Seymour, comb. nov., based on Polypodium Mitchellae Baker in Hemsley, Biol. Centr. Amer. 3:664. 1885. Illustrated in Maxon, Contr. U. S. Nat. Herb. 17:410, pl. 14. 1914. For fuller information, see Maxon, Contr. U. S. Nat. Herb. 13:43. 1909.

British Honduras (GH, US), Guatemala (GH, US), Panama (US).

117. G. myosuroides (Sw.) Sw., in Schrader, Journ. 1800 (2):18. 1801. Polypodium myosuroides Sw., Prod. 131. 1788. For fuller description, see Maxon, Fl. Porto Rico 6:409. 1926. Illustrated in Copeland, Amer. Fern Journ. 42:48-50. 1952; and Maxon, Contr. U. S. Nat. Herb. 17:542-557. 1916; and Lasser, Fl. Venezuela 1(2): t. 179. 1969.

Guatemala (US), Costa Rica (FLAS).

118. G. serrulata (Sw.) Sw., Journ. Bot. Schrader 1800 (2): 18. 1801. Acrostichum serrulatum Sw., Prodr. Veg. Ind. Occ. 128. 1788. Type: Jamaica, Swartz. Polypodium serrulatum Mett., Fil. Lips. 30. 1856; non Polypodium serrulatum Sw., 1801. Xiphopteris serrulata (Sw.) Kaulf., Enum. Fil. 85. 1824. Polypodium duale Maxon, Contr. U. S. Nat. Herb. 16:61. 1912. For synonymy, see Maxon, Contr. U. S. Nat. Herb. 10:491-492. 1908; 16:61. 1912; 17:399. 1914; and Morton, Contr. U. S. Nat. Herb. 38:95-96. 1967. For fuller description, see Maxon, Fl. Porto Rico 6:409. 1926. Illustrated in Copeland, Amer. Fern Journ. 42:51. 1952.

British Honduras (GH, US), Guatemala (GH, US), Honduras (GH, US), Costa Rica (FLAS, GH, US), Panama (US), Dominica (FLAS), Mauritius, tropical Africa.

Nicaragua, Sta. Maria de Ostuma, Dept. Matagalpa, WMW 23453 (US); Sta. Maria de Ostuma, Disparate de Potter, WMW 27635 (US); N of Sta. Maria, road to La Fundadora, WMW 24854 (US).

Greytown, Dept. Rio San Juan, Wright (GH, US).

Chontales, reported by Hemsley, Biol. Cent. Am. 111:669. 1879-1888.

Without definite locality, Wright (GH, US).

Genus GRAMMITIS, section XIPHOPTERIS, cont.

119. G. setulosa (Rosenst.) Seymour, comb. nov., based on Polypodium setulosum Rosenst., Fedde Repert. 10:277. 1912. Type: Costa Rica, Tonduz, Jiminez 214 (US).

Guatemala (US), Costa Rica (FLAS, GH, US).

120. G. Skutchii (Maxon) Seymour, comb. nov., based on Polypodium Skutchii Maxon, Proc. Biol. Soc. Wash. 51:34. 1938. Illustrated, Amer. Fern Journ. 42:51, t. 3(D). 1952. Guatemala (GH, US).

121. G. trichomanoides (Sw.) Ching, Bull. Fan Mem. Inst. Biol. Bot. 10. 1941. Polypodium trichomanoides Sw., Prod. 131. 1788. Illustrated in Maxon, Contr. U. S. Nat. Herb. 17: 550, pl. 35. 1916. See also Copeland, Amer. Fern Journ. 42: 102. 1952. Guatemala (US), Honduras (US), Costa Rica (GH), Panama (US), Jamaica (FLAS).

Nicaragua, reported from Chontales, Hemsley, Biol. Cent. Am. 111:671. 1879-1888.

122. G. truncicola (Klotzsch) Morton, Contr. U. S. Nat. Herb. 38:98. 1967. Polypodium trunciculum Klotzsch, Linnaea 20:374. 1847. Type: Venezuela, Colonia Tovar, Moritz 252; isotype (US). Illustrated, Lasser, Fl. Venezuela 1(2), t. 180. 1969. Polypodium andinum Hk., 2 Cent. t. 6. 1860, illustrated; non Karsten, 1861. Costa Rica (US), n. S. A.

123. G. zurquina (Maxon ex Copel.) Seymour, comb. nov., based on Polypodium zurquinum Maxon ex Copel., Amer. Fern Journ. 42:99, pl. 9. 1952. Illustrated p. 100. Costa Rica (US).

Genus GRAMMITIS, section CRYPTOSORUS.

Blades deeply lobed or pinnate. Sori more than 1 on a pinna. Veins simple or forked.

Alfarii	delicatula	leptostoma	sectifrons
alsophicola	dissimulans	megaloura	semihirsuta
ambigens	fabaespora	melanosticta	senilis
anfractuosa	firma	meridensis	subcapillaris
apiculata		mollissima	subsessilis
asplenifolia	heteromorpha	moniliformis	subtilis
atroviridis	Homersleyi	nudipes	suprasculpta
capillaris	isidrensis	paucisora	taxifolia
carnosula	jamesonioides	pilosissima	Tmesipteris
Chrysleri	Knightii	podocarpa	transiens
cuencana	lanigera	pruinosa	turrialbae
cultrata	Lehmanniana	rigens	vernica

The following species are treated by Copeland as genus Ctenopteris in Philip. Journ. Sci. 84:831-473, 1956; and some of them as part of genus Grammitis by Morton, Contr. U. S. Nat. Herb. 38:85-123. 1967.

Genus GRAMMITIS, section CRYPTOSORUS, cont.

124. G. Alfarii (Donn. Smith) Morton, Contr. U. S. Nat. Herb. 38:103. 1967. Description in Latin, quoted by Copeland, says "glabra", but Copeland, q. v., says on same page 433, "far from glabrous".

Costa Rica (GH, US, VT), Panama (US), Venezuela, Ecuador.

125. G. alsophicola (Christ) Seymour, comb. nov., based on Polypodium alsophicolum Christ, Bull. Soc. Bot. Geneve II, 1:219. 1909. Known only from type collection. Costa Rica (US).

126. G. ambigens (Copel.) Seymour, comb. nov., based on Ctenopteris ambigens Copel. Philip. Journ. Sci. 84:460, t. 13. 1965. Illustrated. Costa Rica (US), Colombia?

127. G. anfractuosa (Kunze ex Klotzsch) Proctor, Rhodora 63: 35. 1961. Polypodium anfractuosum Kunze ex Klotzsch, Linnaea 20:375. 1847. Polypodium induens Maxon, Bull. Torr. Club 32: 75. 1905. Type: Venezuela, Merida, Moritz 330; isotype (US). Veins obscure. Copeland says segments glabrous. Resembling Grammitis delitescens. Guatemala (US), Honduras (GH, MO), Costa Rica (FLAS, GH, MO), Panama (GH) to Peru, W. I.

128. G. apiculata (Kunze ex Klotzsch) Seymour, comb. nov., based on Polypodium apiculatum Kunze ex Klotzsch, Linnaea 20:378. 1847. Blade pinnate; no scales beneath.

Honduras (GH, US), Costa Rica (GH, US), n. S. A.

129. G. asplenifolia (L.) Seymour, comb. nov., based on Polypodium asplenifolia L., Sp. Pl. 2:1084. 1753; non Polypodium suspensum L., Sp. 2:1084. 1753.

Copeland (Philip. Journ. Sci. 84:444. 1955) interprets P. asplenifolia and P. suspensa as synonyms. However, quoting earlier descriptions, he states that P. suspensum is "glabris" whereas P. asplenifolia is "pilosus". Some later writers, e.g. Morton (Contr. U. S. Nat. Herb. 38:58. 1967) treat them as distinct. Illustrated, Lasser, Fl. Venezuela 1(2), t. 191. 1969. Stipes (at least near base) and axis and margins of pinnae with long (2 mm) spreading hairs. Longest segments 1-1.5 cm long. From many species it may be distinguished by the length of stipes 10-23 cm long in mature plants.

British Honduras (GH), Guatemala (GH, US), Honduras (GH, US), Salvador (US), Costa Rica (FLAS, GH, US), Panama (GH, US) to Bolivia, Jamaica (FLAS), Cuba (FLAS).

Nicaragua, N of Sta. Maria, road to La Fundadora, WMW 24946 (US).

130. G. atroviridis (Copel.) Seymour, comb. nov., based on Ctenopteris atroviridis Copel., Philip. Journ. Sci. 84:461. 1956. Type: Costa Rica, Torres 195 (US).

131. G. capillaris (Desv.) Seymour, comb. nov., based on Polypodium capillare Desv., Berol. Mag. 5:316. 1811. Polypodium fucoides Christ, Bull. Boiss. II, 512. 1905. Polypodium

Genus GRAMMITIS, section CRYPTOSORUS, cont.

crassulum Maxon, Contr. U. S. Nat. Herb. 17:598. 1916, where fully described. In Ind. Fil. Suppl. 2, P. crassulum is treated as a distinct species. See Maxon, Proc. Biol. Soc. Wash. 43: 83. 1930. Similar to G. podocarpa. Illustr., Lasser Fl. Venezuela 1(2), t. 190. 1969. Costa Rica (GH, US), n. S. A.

132. G. carnosula (Christ) Seymour, comb. nov., based on Polypodium carnosulum Christ, Bull. Herb. Boiss. II, 4:1102. 1904. Type in Herb. Christ. Copy of original description (US). Costa Rica.

133. G. Chrysleri (Proctor) Seymour, comb. nov., based on Polypodium Chrysleri Proctor, Check List Jam. Pterid. 48. 1953.

Polypodium suspensum Hk., Sp. Fil. IV:196. 1862, partim, non L., Sp. Pl. 2:1084. 1753.

Polypodium arcuatum Moritz ex Mett., Pol. 56n, 67b. 1857.

According to Copeland, nomen nudum et invalidum.

Polypodium Maxonii C. Chr., Ind. Fil. 543. 1906, where P. firmulum Maxon is given as synonym. Segments acute in C. Chrysleri, obtuse and shorter in G. asplenifolia. To distinguish this species from G. delicatula, since both have long stiff reddish hairs:

a. Stipes 5-10 cm long; segments 7-8 mm wide, the longest 25-28 mm long G. Chrysleri (Proctor) Seymour

a. Stipes 1-2 cm long, thread-like; segments 2-2.5 mm wide, the longest 10-12 mm long; long hairs on pinnae beneath G. delicatula (M. & G.) Seymour

134. G. cuencana (Hieron.) Morton, Contr. U. S. Nat. Herb. 38:111. 1967. Polypodium cuencanum Hieron., Bot. Jahrb. 34:505. 1904. Known certainly only from the type, according to Copeland, Philip. Journ. Sci. 84:397. Longest pinnae 7 mm long. Ecuador. The following probably "placed here".

Nicaragua, San Rafael del Norte, alt. 1200-1350 m, Miller & Griscom 159 (US).

135. G. cultrata (Willd.) Proctor, Rhodora 63:35. 1961.

Polypodium elatratum Willd., Sp. Pl. 5:187. 1810.

Polypodium elasticum Eory ex Willd., Sp. Pl. 5:183. 1810; non Rich. 1792.

Type: Bourbon (Reunion), Bory. For name, see Morton, Contr. U. S. Nat. Herb. 38:106-107. 1967.

Mexico, Guatemala (GH, US), Honduras (GH, US), Salvador (US), Costa Rica (FLAS, GH, US), Panama (GH, US), Venezuela to Peru, Greater Antilles.

136. G. delicatula (M. & G.) Seymour, comb. nov., based on Polypodium delicatulum M. & G., Mem. Ac. Brux. 15:35, t. 7, f. 1. 1842. Copy of original description and photo of type (GH). Hairs of axis sometimes 2-3 mm long but apparently brittle and

Genus GRAMMITIS, section CRYPTOSORUS, cont.

often broken and appearing shorter. Mexico, Guatemala (US), Jamaica. For fuller description, see Maxon, Proc. Biol. Soc. Wash. 52:117. 1939.

137. G. dissimulans (Maxon) Seymour, comb. nov., based on *Polypodium dissimulans* Maxon, Contr. U. S. Nat. Herb. 10: 502. 1908. Guatemala (GH).

138. G. fabaespora (Copel.) Seymour, comb. nov., based on *Ctenopteris fabaespora* Copel., Philip. Journ. Sci. 84:457. 1955. Panama.

139. G. firma (J. Smith) Morton, Contr. U. S. Nat. Herb. 38: 110. 1967. *Polypodium firmum* Klotzsch, Linnaea 20:378. 1847; non Kaulfuss 1827. *Ctenopteris firma* J. Smith, Hist. Fil. 184. 1875. *Polypodium aromaticum* Maxon, Proc. U. S. Nat. Mus. 27:743. 1904. See also Maxon, Proc. Biol. Soc. Wash. 52:119. 1939. Ind. Fil. maintains both species as distinct but Copeland does not. Axis with hairs 0.5 mm long. Blade pinnate. Pinnae glabrous. For name, see Morton, l. c. Guatemala (US), Costa Rica (US), W. I., n. S. A. to Bolivia.

140. G. heteromorpha (Hk. & Grev.) Morton, Contr. U. S. Nat. Herb. 38:102. 1967. *Polypodium heteromorphum* Hk. & Grev. Ic. Fil., t. 108. 1829. Illustrated. Mexico (MO), Guatemala (GH, US) to Peru, according to Morton, l. c.

141. G. isidrensis (Copel.) Seymour, comb. nov., based on *Ctenopteris isidrensis* Copel., Philip. Journ. Sci. 84:441. 1956. Costa Rica (US).

142. G. jamesonioides (Fée) Morton, Contr. U. S. Nat. Herb. 38:108. 1967. *Polypodium jamesonioides* Fée, Mem. Foug. 7: 59, t. 21, f. 4. 1857. Illustrated. See also Morton, Proc. Biol. Soc. Wash. 52:118-119. 1939. Guatemala (GH), Costa Rica (GH, US), Canal Zone (GH, US) to Ecuador, Hispaniola, Haiti.

143. G. Knightii (Copel.) Seymour, comb. nov., based on *Ctenopteris Knightii* Copel., Philip. Journ. Sci. 84:419, t. 6, 1955. Illustrated. Pinnatifid. Costa Rica (FLAS, US).

144. G. lanigera (Desv.) Morton var. lanigera, Contr. U. S. Nat. Herb. 38:105. 1967. *Polypodium lanigerum* Desv., Berol. Mag. 5:316. 1811. *Polypodium alternifolium* Hk., Sp. Fil. 4: 222, t. 277A. 1862; non Willd., Sp. 5:168. 1810. *Polypodium sericeo-lanatum* Hk., Sp. Fil. 4:221. 1864. *Polypodium longum* C. Chr., Ind. Fil. 541. 1906. *Ctenopteris sericeo-lanata* Copel., Philip. Journ. Sci. 84:420-421. 1955. Pinnate. Costa Rica (US) to Bolivia, Hispaniola, Martinique.

Genus GRAMMITIS, section CRYPTOSORUS, cont.

145. G. Lehmanniana (Hieron.) Morton, Contr. U. S. Nat. Herb. 38:104. 1967. Polypodium Lehmannianum Hieron., Engl. Jahrb. 34:513. 1904; non Polypodium Lehmannii Mett., Pol. 117, pl. 3, f. 35. 1857. Polypodium pastoense C. Chr., Ind. Fil. 551. 1906. Guatemala (US), Costa Rica (GH, US) to Ecuador.

146. G. leptostoma (Fée) Seymour, comb. nov., based on Polypodium leptostomum Fée, Mem. Foug. 7:58, t. 21, f. 2. 1857. Illustrated. Copy of original description (GH). Polypodium productum Maxon, Contr. U. S. Nat. Herb. 13:11. 1909, which gives a full description. Pinnate. Guatemala (US).

147. G. melanosticta (Kunze) Seymour, comb. nov., based on Polypodium melanostictum Kunze, Linnaea 9:44. 1834.

Type: Peru, Poeppig.

Guatemala (US), Costa Rica (US), n. S. A., Dominica.

148. G. meridensis (Klotzsch) Seymour, comb. nov., based on Polypodium meridense Klotzsch, Linnaea 20:380. 1847. Salvador (US), Costa Rica (US), Canal Zone (US), Jamaica, n. S. A.

149. G. mollissima (Fée) Proctor, Rhodora 63:35. 1961. Polypodium mollissimum Fée, Mem. Foug. 11:47, t. 12, f. 2. 1866. Illustrated. For fuller description, see Maxon, Fl. Porto Rico 6:411. 1926. For discussion of pubescence, see Weatherby, Amer. Fern Journ. 25:58-59. 1935. Pendent. Blades attenuate at base, divided to axis in lower and upper part. Mexico, British Honduras (GH), Guatemala (GH, US), Honduras (GH, US), Costa Rica (US), Panama (GH, US), W. I.

150. G. moniliformis (Lag. ex Sw.) Proctor, Brit. Fern Gaz. 9:219. 1965. Polypodium moniliforme Lag. ex Sw., Syn. 33. 1806. Type from Peru. Illustrated, Lasser, Fl. Venezuela 1(2), t. 203. 1969. Mexico, Guatemala (GH, US), Honduras (with Polypodium pilosissimum) (GH, US), Costa Rica (FLAS, GH, US), Panama (GH, US) to Bolivia, Greater Antilles, Jamaica.

151. G. nudipes (Copel.) Seymour, comb. nov., based on Ctenopteris nudipes Copel., Philip. Journ. Sci. 84:405, t. 4. 1955. Illustrated. Panama (US).

152. A new unpublished species; omitted.

153. G. pilosissima (M. & G.) Morton, Contr., U. S. Nat. Herb. 38:114. 1967. Polypodium pilosissimum M. & G., Mem. Ac. Brux. 15:39, t. 9, f. 2. 1842. Illustrated there and in Lasser, Fl. Venezuela 1(2): t. 190. 1969. Ctenopteris megaloura Copel., Philip. Journ. Sci. 84:391. 1955, a synonym according to Dr. D. B. Lellinger in private correspondence. Growing on rocks or ground. Mexico, Guatemala (GH, US), Honduras (US), Costa Rica (FLAS, GH, US), Panama (GH, US), n. S. A.

Genus GRAMMITIS, section CRYPTOSORUS, cont.

154. G. podocarpa (Maxon) Seymour, comb. nov., based on Polypodium podocarpum Maxon, Smith's Misc. Coll. 56:24, 2, t. 1-3. 1911. Illustrated. Panama (GH, US).

155. G. pruinosa (Maxon) Seymour, comb. nov., based on Polypodium pruinatum Maxon, Proc. Biol. Soc. Wash. 52:117. 1939. P. pruinatum Baker in Hk. & Bak., Syn. Fil. ed. 2:508. 1874; non Sw. 1801. Known only from type material in Kew. No specimen seen. Type: Nicaragua, Chontales, Tate 44 (K). Record (US). "Cut more than half way" to midrib. For fuller information, see Morton, Contr. U. S. Nat. Herb. 38:262. 1973.

156. G. rigens (Maxon) Prætor, Brit. Fern Gaz. 9:219. 1965. Polypodium rigens Maxon, Proc. U. S. Nat. Mus. 27:741. 1904. Type: Jamaica, John Crow Peak, 1650-1800 m, Maxon 1346 (US). Not certainly distinct from G. pilosissima according to Morton, Contr. U. S. Nat. Herb. 38:114. 1967. Growing on trees. Stipes 2-4.5 cm long, with dense long spreading bright-brown hairs. Tip entire or serrate. Pinnae 3.5 mm wide, 10 mm long. Guatemala to Peru, Greater Antilles, Jamaica.

157. G. sectifrons (Kunze ex Mett.) Seymour, comb. nov., based on Polypodium sectifrons Kunze ex Mett., Pol. 99, n. 181, t. 2, f. 3-4. 1857. So similar is this species to Polypodium angustum, that in Ind. Fil. 562 it is treated as a variety of P. angustum. It is exceptional in this section in having netted veins. See comment under Polypodium angustum, p. 39.

158. G. semihirsuta (Klotzsch) Morton, Contr. U. S. Nat. Herb. 38:113. 1967. Polypodium semihirsuta Klotzsch, Linnaea 20:379. 1847. Type: Peru, Ruis & Pavon; isotypes (US). Segments glabrous 10-20 mm long, glabrous except ciliate margin, close together.

Guatemala (GH), Honduras (GH, US), Costa Rica (GH, MO, US), Panama (GH, US) to Bolivia & Brazil, Jamaica, Hispaniola.

159. G. senilis (Fée) Morton, Contr. U. S. Nat. Herb. 38:103. 1967. Polypodium senile Fée, Mem. Foug. 7:60, t. 25, f. 1. 1857. Illustrated. Type: Colombia, Ocana, Dept. Santander, Schlim 364. For information, see Maxon, Contr. U. S. Nat. Herb. 13:43. 1909. Stipe, axis and pinnae beneath with long whitish or pale-yellowish hairs. Blade pinnatifid near tip, pinnate below. Guatemala (US), Costa Rica (FLAS, GH, US), Panama (GH, US) to Ecuador, W. I.

160. G. subcapillaris (Christ) Seymour, comb. nov., based on Polypodium subcapillare Christ, Bull. Boiss. II, 5:1. 1905. Type: Costa Rica, La Palma, Prov. Cartago, Werckle 17033. Photo and fragment (US). Copy of original description (GH). Another specimen: Costa Rica, Standley & Valerio 47022 (GH).

Genus GRAMMITIS, section CRYPTOSORUS, cont.

161. G. subsessilis (Baker) Morton, Contr. U. S. Nat. Herb. 38:107. 1967. Polypodium subsessile Baker, in Hk. & Baker, Syn. Fil. 329. 1868. Illustrated as Polypodium pteropus Hk., Sp. Fil. 4:192, t. 275 B. 1862; non Blume 1828. Illustrated in Lasser, Fl. Venezuela 1(2), t. 202. 1969. Polypodium chiricanum Maxon, Contr. U. S. Nat. Herb. 17: 597, pl. 43. 1916. Illustrated. Known only from type. (Panama, Chiriqui, Maxon 5478 (US).) Morton does not list this as a synonym. In Ind. Fil., maintained as a distinct species. Axis not winged altho pinnae decurrent. According to original description of P. chiricanum, pinnae are acute or acutish, but in the accompanying illustration they appear to be blunt. Pinnae 3-5 mm wide, 1-3 times their width apart. Stipe minutely hairy hairy. See Copeland, Philip. Journ. Sci. 84:411. 1955. Costa Rica (US), Panama (FLAS, US), to Bolivia.
162. G. subtilis (Kunze ex Klotzsch) Morton, Contr. U.S. Nat. Herb. 38:104. 1967. Polypodium subtile Kunze ex Klotzsch, Linnaea 20:375. 1847. Type: Venezuela, Merida, Moritz 325; isotype (US). Guatemala (GH, US), Costa Rica (GH, US), Panama (GH, US) to Ecuador.
163. G. suprasculpta (Christ) Seymour, comb. nov., based on Polypodium suprasculptum Christ, Bull. Boiss. II, 5:3. 1905. Costa Rica (GH, US), Panama (GH, US).
164. G. taxifolia (L.) Proctor, Rhodora 63:35. 1961. Polypodium taxifolium L. For fuller description, see Maxon, Fl. Porto Rico 6:412. 1926. Illustrated, Lasser, Fl. Venezuela 1(2), t. 202. 1969. Costa Rica (US), Canal Zone (US), W. I., Venezuela, Ecuador, Surinam, Brazil.
165. G. Tmesipteris (Copel.) Seymour, comb. nov., based on Ctenopteris Tmesipteris Copel., Philip. Journ. Sci. 84:410. 1955. Polypodium Tmesipteris Maxon in herb. Type: Costa Rica, Standley 43755 (US). Collected only once. Specimen not seen.
166. G. transiens (Lindm.) Seymour, comb. nov. P. transiens Lindm. Ark for Bot. 1:235, t. 11, f. 7, 1903. Illustrated. Closely related to Polypodium Kalbreyeri Baker, Tr. Linn. Soc. II, Bot. 2:291. 1897, and often confused with it. Specimens often originally determined Polypodium Kalbreyeri. Guatemala (US), Costa Rica (FLAS, GH, US), Panama (GH, US), Colombia, Venezuela, Peru.
167. G. turrialbae (Christ) Seymour, comb. nov., based on Polypodium turrialbae Christ, Bull. Soc. Bot. Belg. 35:226. 1896. Costa Rica.

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168. G. vernicosa (Copel.) Morton, *Ctenopteris vernicosa* Copel., *Philip. Journ. Sci.* 84:452, pl. 9. 1955. Illustrated. On page 452, l. c., we read "lamina . . . basi vix angustata", but in plate 9, the lowest pinnae are less than 1/2 as long as the longest.

Costa Rica, Colombia, Ecuador.

EXCLUDED OR DOUBTFUL SPECIES.

Polypodium antillense Maxon, *Proc. Biol. Soc. Wash.* 43: 83. 1930. Goniophlebium acuminatum Fée, *Mem. Foug.* 11:68, pl. 19, f. 1. 1826. Mistakenly attributed to Guatemala. Known in W. I.

Polypodium crispulum Christ, *Bull. Boiss.* II, 4:1102. 1904. Attributed to Costa Rica in *Ind. Fil.* 519. 1906. Occurrence in Costa Rica not confirmed.

Polypodium Falcaria Kunze, *Linnaea* 18:316. 1844. Hooker & Baker, *Synopsis Filicum* 343, say: "From this [*P. loriceum* L.] we cannot distinguish clearly *P. dasyleuron* and *Falcaria* (Kze.) and *laetum* (Raddi)." Since then, *P. dasyleuron* has been distinguished, but Dr. Lellinger writes in personal correspondence that the status of *P. Falcaria* is still uncertain.

Grammitis flabelliformis (Poiret) Morton, *Contr. U. S. Nat. Herb.* 38:57. 1967. *P. rigescens* Bory ex Willd. in L., *Sp. Pl.* ed. 4, 5:183. 1810. Reported from Guatemala, Costa Rica and Canal Zone. For name, see Morton, *Contr. U. S. Nat. Herb.* 38:115. 1967, where he gives the distribution as Africa and Reunion and Venezuela to Peru and Brazil but does not mention Central America.

Polypodium Kalbreyeri Baker, *Timebri* II, 5:215. 1886. *Trans. Linn. Soc. II, Bot.* 2:291. A species of northern South America sometimes attributed to Central America.

Polypodium laevigatum Cav., *Descr.* 244. 1802. Reported by Shimek, *Bull. Iowa Univ.* 4:201. 1896, in Castillo, Nicaragua. Reported by *Ind. Fil.* 537 as in tropical America but in *Corrig.* 1:125, reported only from the Andes. Hooker & Baker, *Syn. Fil.* 348 report it in Guatemala and southward. Occurrence in Central America not confirmed.

Grammitis laxa (Presl) Morton, *Contr. U. S. Nat. Herb.* 38:105. 1967. *Polypodium laxum* Presl, *Rel. Haenk.* 1:23, pl. 4, f. 1. 1825. *Ind. Fil. Corrig.* 2:54 reports this species from Costa Rica and gives *Polypodium crispulum* Christ, *Bull. Boiss.* II, 4:1102. 1904 as a synonym. Copeland makes *P. laxum* a synonym of *P. lanigerum*. Morton, *Contr. U. S. Nat. Herb.* 38:105. 1967 disagrees. Occurrence in Central America not confirmed.

EXCLUDED or DOUBTFUL SPECIES, cont.

Polypodium mexicanum (Fée) Salom., Nom. 308. 1883.
Reported from Costa Rica. Occurrence in Central America not confirmed.

Polypodium puberulum C. & S.
Reported in Nicaragua, Chontales, Hemsley, Biol. Cent. Am. 111:667. Occurrence in Central America not confirmed.

Polypodium repens L., Hooker & Baker, Syn. Fil. 348, use this authority for some species in section Campyloneuron. Christensen in Ind. Fil. does not list it. Authority an error.

Polypodium reptans Sw., Hooker & Baker, Syn. Fil. 316, list it from W. I. and Guatemala to Brazil. No specimen seen. Occurrence in Central America not confirmed.

Polypodium rosulatum Christ, Bull. Boiss. 4:662. 1896.
Collected only once, that collection in Costa Rica. Copy of original description (GH). I cannot place this species.

Polypodium sessifolium Desv., Prod. 238. 1827.
Reported from Costa Rica - Peru, W.I., Ind. Fil. Corrig. 1: 127. *P. surucuchense* Hk., 1837. *P. andinum* Karsten, 1861; non Hk. Occurrence in Central America not confirmed.

Polypodium squamatum L., Sp. Pl. 1086. 1753. Reported from Costa Rica but probably in error. Known in W.I.

Polypodium suspensum L. Due to confusing this species with *P. asplenifolium* L., it has been attributed to Central America. The species in Central America, sometimes called *P. suspensum*, is *P. asplenifolium* or *Grammitis asplenifolia*. See comment under same, p. 48.

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- INDEX of species and synonyms mentioned in this article.
Numbers refer to pages. An initial, G. or P., indicates whether a species belongs to Grammitis or Polypodium.
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 adnatum Kunze P. 11, 34 6, 44
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sphenodes Kunze P. 4, 42 *yarumalensis* (Hieron.)
squamatum L. P. 55 Proctor G. 6, 45
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subsessilis (Baker) Morton G. in common use.
 14, 53 AMN, Atwood, John T., Jr.,
subtilis (Kunze) Morton G. Steven A. Marshall &
 15, 53 David A. Neill
suprasculpta (Christ) Seymour ENAG, Escuela Nacional de
 G. 18, 53 Agricultura y Ganaderia,
 Managua, Nicaragua
surucuchense Hk. P. = H. & B., Humboldt & Bonpland
 sessifolium Desv. Illustr., illustrated
suspensum L. P. 55 M. & G., Martens & Galeotti
suspensum Hk. P. = *Chrysleri* MHV, Maxon, W. R., A. D.
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tectum Kaulfuss P. 5, 34 West De Pere, Wis.
tenuipes (Maxon) C. Chr. P. WMW, Williams, L. O.,
 4, 42 Antonio Molina R. &
thyssanolepis A. Br. P. 23, 32 Terua P. Williams

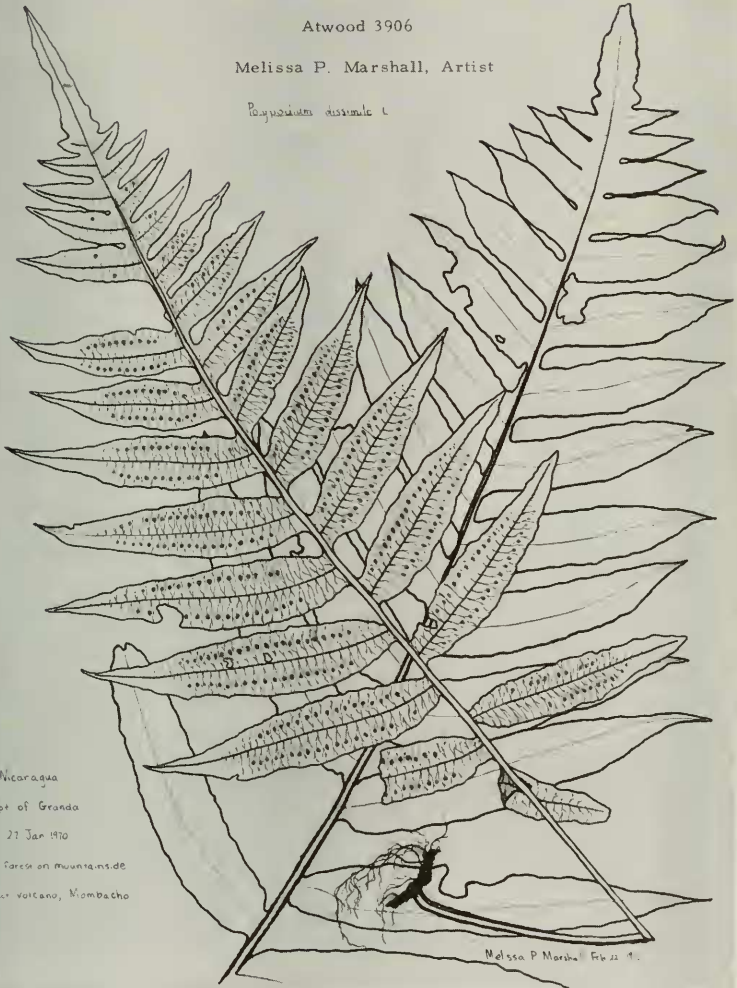
Polypodium dissimile L.

Plate 1

Atwood 3906

Melissa P. Marshall, Artist

Polypodium dissimile L.



Nicaragua
 Dept of Granda
 27 Jan 1970
 ran farca on mountainside
 Casimr volcano, Nombacho

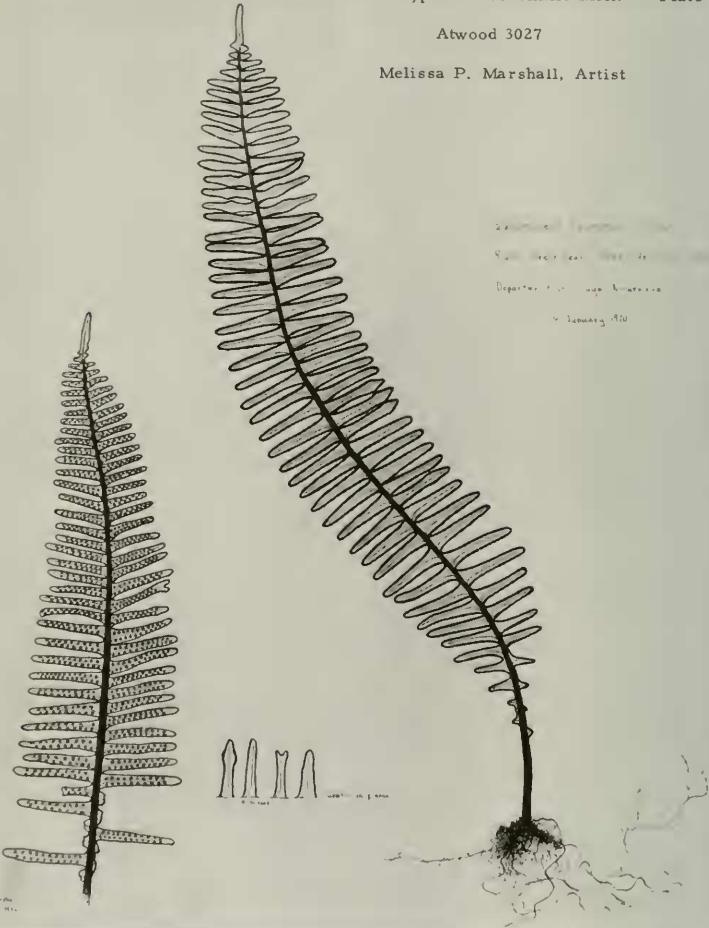
Melissa P Marshall Feb 22 71.

Polypodium consimile Mett. Plate 2

Atwood 3027

Melissa P. Marshall, Artist

2400 University Avenue
Stanford University
Department of Botany
January 1910



Polypodium Plumula L.

Plate 3

Atwood 3820

Melissa P. Marshall, Artist



Polypodium Plumula L.
 Bocca, Nicaragua rain-forest mountain side
 27 January 1972

Polypodium Lindenianum Kunze

Plate 4

Seymour & Atwood 4033

Melissa P. Marshall, Artist



Polypodium Lindenianum Kunze

Seymour & Atwood
4033
M. P. Marshall